# A COMPARATIVE ANALYSIS OF PSYCHIATRIC PROFILE, DEPRESSION AND BODY DYSMORPHIC DISORDER IN PATIENTS WITH AMPUTATION AND POST STROKE

*Dissertation Submitted to the*
**THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY**

In partial fulfilment of the requirements

for the award of degree of

**M.D. (Branch**-XVIII)

**PSYCHIATRY**

**GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL**

Chennai

**THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY,**

**CHENNAI, TAMILNADU**

**April 2013**

# CERTIFICATE

This is to certify that this dissertation entitled **"A COMPARATIVE ANALYSIS OF PSYCHIATRIC PROFILE, DEPRESSION AND BODY DYSMORPHIC DISORDER IN PATIENTS WITH AMPUTATION AND POST STROKE",** submitted by **Dr.ASHOKA KUMAR K.S** to the faculty of PSYCHIATRY, The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of the requirement in the award of degree of M.D. Branch - XVIII (PSYCHIATRY), for the April 2013 examination is a bonafide research work carried out by him during the period of June 2012 to November 2012 at Government Stanley Medical College and Hospital, Chennai, under our direct supervision and guidance of **Prof**. **Dr. G.S.CHANDRALEKA**, Professor and Head, Department of Psychiatry at Stanley Medical College, Chennai.

**Prof. Dr .G.S.CHANDRALEKA, M.D., DPM.**

Guide and HOD,

Department of Psychiatry,

Stanley Medical College and Hospital,

chennai – 600 001.

**Prof . Dr. S.GEETHA LAKSHMI, M.D, Ph.D**

Dean

Government Stanley Medical College,

Chennai – 600001.

# CERTIFICATE

This is to certify that the dissertation presented herein by **"A COMPARATIVE ANALYSIS OF PSYCHIATRIC PROFILE, DEPRESSION AND BODY DYSMORPHIC DISORDER IN PATIENTS WITH AMPUTATION AND POST STROKE", Dr. ASHOKA KUMAR K S,** is an original work done in the Department of Psychiatry, Government Stanley Medical College and Hospital, Chennai in partial fulfilment of regulations of the Tamilnadu Dr. M.G.R. Medical University for the award of degree of M.D. (PSYCHIATRY) Branch XVIII, under my supervision during the academic period 2010-2013.

**Prof. Dr. G.S.CHANDRALEKA, M.D., D.P.M,**

Professor and H.O.D.

Department of Psychiatry,

Stanley Medical College

and Hospital, Chennai – 600 001.

**Prof. Dr. S. GEETHA LAKSHMI, M.D.,Ph.D.**

Dean

Stanley Medical College,

Chennai – 600 001.

# DECLARATION

I, **Dr .ASHOKA KUMAR K.S**, Solemnly declare that the dissertation **"A COMPARATIVE ANALYSIS OF PSYCHIATRIC PROFILE, DEPRESSION AND BODY DYSMORPHIC DISORDER IN PATIENTS WITH AMPUTATION AND POST STROKE",** is a bonafide work done by me during the period of June 2012 to November 2012 at Government Stanley Medical College and Hospital, under the expert supervision of **Prof. Dr. G.S.CHANDRALEKA, M.D, D.P.M.,** Professor and Head of Department Of Psychiatry, Government Stanley Medical College, Chennai.

This thesis is submitted to The Tamil Nadu Dr .M.G.R. Medical University in partial fulfilment of the rules and regulations for the M.D. degree examinations in Anaesthesiology to be held in April 2013.

Chennai-1 **Dr .ASHOKA KUMAR K.S.**

Date:

# ACKNOWLEDGEMENT

With sincere gratitude, I wish to acknowledge the expert guidance and precise suggestions of my HOD **Prof. Dr .G.S.CHANDRALEKA MD., DPM.,** without whose guidance this study would not have been possible, and **Prof. Dr.T.V. ASOKAN MD.**, **DPM**., Department of Psychiatry, Stanley Medical College, Chennai for the able guidance, inspiration and encouragement rendered at every stage of this study.

My profound thanks to **Prof Dr.S. GEETHALAKSHMI MD, Ph.D,** Dean, Stanley Medical College and Hospital, Chennai for permitting me to utilize the clinical materials of this hospital for my dissertation.

I wish to thank **Prof. Dr. B. EZHIL RAJAN**, Prof and Head, Department of Orthopaedics, **Prof. Dr. S. MAGESH KUMAR**, Prof and Head, Department of Medicine, and **Prof. Dr. L. MOHAN**, Prof and Head, Department of Plastic Surgery for their valuable suggestions and guidance in completing my thesis.

I am grateful to **Dr.M.MOHAMMED ILYAS RAHAMATHULLA** and **Dr.VENKATESH MATHAN KUMAR,** Asst. Professor, Dept. of Psychiatry, Stanley Medical College for their guidance.

I am also deeply indebted to **Dr. M. SURESHKUMAR MD, DPM**, consultant Psychiatrist, Chennai for their valuable guidance and suggestions.

I also thank **DR.PRADEEP MENON, MD, DPM**, Psychiatrist, ICMR and also **Dr.S.Venkatesan**, Director, Dept. Of statistics and **Mr.T.Srinivas**, who helped me in statistical analysis.

I gratefully acknowledge my patients who gave their consent and co-operation for this study.

# CONTENTS


| S.NO. | TITLE | PAGE NO. |
|---|---|---|
| 1. | INTRODUCTION | |
| 2. | REVIEW LITERATURE | |
| 3. | AIMS AND OBJECTIVES | |
| 4. | MATERIALS AND METHODS | |
| 5. | OBSERVATIONS AND RESULTS | |
| 6. | DISCUSSION | |
| 7. | SUMMARY | |
| 8. | CONCLUSION | |
| 9. | LIMITATIONS AND SUGGESTIONS | |
| 10. | ANNEXURES | |
| | (a) BIBLIOGRAPHY | |
| | (b) PROFORMA | |
| | (c) SCALES | |
| | (d) MASTER CHART | |
| | | |

# Introduction

Amputation is defined as the removal of extremities of body part by trauma or by surgical procedure. Amputees may feel empty, and mutilated. Amputation due to trauma is a catastrophic injury and causes major disability in most of the cases (Wald 2004)[1]. Loss of limb is associated with low self-esteem, body image disturbance, social isolation and also a sense of stigmatization (William et al. 2004). In many conditions amputation is unavoidable. Irrespective of the aetiology, amputation is considered as a mutilating surgery and it definitely affects the lives of the patients (De Godoy et al. 2002). Limb amputation is a more commonly occurring event in the present society.

The loss of a limb distorts the individual's body image leading to the thought of not being a complete human being. The loss of the functions performed with that limb renders him helpless for sometime. The amputee not only loses physical functioning, he also loses hope and future aspirations, his plans and ambitions get shattered. Thus, he loses not only a limb but also a part of his world and future. Most of them remain anxious and worried about their interpersonal relationship in

the social, vocational, familial and marital milieu. Individuals having an overt mental breakdown will need active psychiatric intervention whereas careful psychiatric interview is necessary for the ones whose mental symptoms are not so obvious.

Limb loss is a major event that can severely impact the psychological health of the individual concerned. Studies show that 20-60% of the amputees attending follow up clinics are assessed to be clinically depressed. Individuals with traumatic amputation irrespective of the age are likely to suffer from body image problems, but these findings are more common in younger individuals. The psychological reactions to amputation are clearly diverse ranging from severe disability at one extreme; and a determination to effectively resume a full and active life at other end. In adults the age at which an individual receives the amputation is an important factor. Studies by *Bradway JK et al (1984)*[2], *Kohl SJ Et al (1984)*[3], *Livneh H (1999)*[4], on the psycho-social adaptation to amputation has led to a plethora of clinical and empirical findings. *Kingdon D et al* 1982 equated amputation with loss of one's perception of wholeness, while (*Parkes CM 1976)*[5] with loss of spouse and (*Block WE et al (1963)*[6] with symbolic castration & even death. The individual's response to a traumatic event is influenced by personality traits, pre-morbid psychological state, gender, peri-traumatic dissociation,

prolonged disability of traumatic events, lack of social support and inadequate coping strategies. Previous studies on amputation mainly focused on demographic profile, coping skills and outcome; with there being a scarcity of literature on prevalence of various specific psychiatric disorders in the post-amputation period.

Most patients with a limb loss irrespective of whether due to traumatic injury or surgical procedures go through a series of complex psychological reactions reported by Cansever et al (2003)[8]. Most people try to cope with it, those who don't succeed develop psychiatric symptoms Frank et al (1984)[7]. Shukla et al[9] noted that psychological intervention in some form is needed in about 50% of all amputees, and Shukla et al[9] reported depression to be the most common psychological reaction following amputation.

The three major problems faced by many amputees are anxiety, depression and physical disability (Green 2007)

Horgan & MacLachlan (2004)[10] found that anxiety is associated with depression, low self esteem, poorer quality of life and higher level of general anxiety. Both anxiety and depression are associated with higher disability as age increases.

Body image is the combination of psychosocial adjustment and attitude of the individual that are related to the function and appearance of one's own body which can be influenced by the individual and his environmental factors (Horgan &

MacLachlan 2004)[10]. Each person has an idealized body image, which he uses for measuring perceptions and concepts of his or her own body (Fishman, 1959)[11]. From another perspective, Flannery & Faria (1999) body image is viewed as a dynamic, changing phenomenon occurring in a person and it is formed by the constantly changing perceptions about his body. According to Newell (1991)[13], attractive people after amputation will receive less reinforcement from others leading to low self-esteem and reduced positive self-image. Jacobsen et al (1997) supports this stating i.e. amputation leads to disfigurement which in turn leads to a negative body image and greater loss of social acceptance. The relationship between disability experience and stigma are interwoven and inter-dependent. The reason for the amputee's subjective perception of being unfit for the society probably is that body image provides a sense of ''self' 'and also affects the persons thinking (Wald 2004)[1]. According to Kolb (1975)[14], changes in body image may cause series of psychological reactions.

The psychiatric aspect of amputation has received scant interest in our country, in spite of accidental injuries being common (Shukla et al., 1982)[9]. The commonest psychiatric disorder seen in amputees is major depression. Randall et al. (1945)[15] have reported an incidence of 61 % in non-battle casualties, while Shukla et al. (1982)[9] found depressive neurosis (40%) and psychiatric depression (22%) to be

the leading psychiatric disorders in amputees; only 35% of the total sample in the later study had nil psychiatric disorders. The paucity of literature in this field has prompted us to study about amputation and its co morbid psychiatric conditions so that proper care & management for the patients can be planned. The present study was undertaken with the aim of studying the psychiatric problems especially anxiety, depression and Body Dysmorphic Disorder which may be associated with disability or changed life circumstances in the immediate post-amputation period. A comparison was made with Stroke patients, as these patients often experience physical and social handicaps similar to amputees.

Depression is the most common mood disorder to follow stroke (Starkstein & Robinson, 1989), with major depression affecting around one quarter to one third of patients (Hackett[16]).

Depression hampers functional recovery in a post stroke individual. In Diagnostic and statistical manual (DSM) IV Post Stroke Depression classified under "mood disorder due to general medical condition (i.e. stroke)" with the specific depressive features, major depressive-like episodes, manic features or mixed features. Studies describe that cerebral ischemia is associated with two types of depressive disorder. Incidence of major and minor depression is 25% and 30% respectively. Prevalence

may vary over time with an apparent peak 3months after the stroke and subsequently decline in prevalence at 1 year. Robinson and colleagues studies showed a spontaneous remission in the natural course of major depression occurring post stroke in the first to second year following stroke. However in few cases depression may become chronic and persist for a longer period.

While some propose that post stroke depression is due to stroke affecting the neural circuits concerned with mood regulation (thereby supporting a primary biological mechanism), others in the scientific community claim it to be due to the ensuing psycho-social stressors occurring as a result of stroke. Though an integrated bio- psycho- social model is warranted, most studies clearly suggest biological mechanism to have an upper hand in the later post stroke period than in the immediate phase.

In the same way Anxiety is also common in post stroke individuals with the incidence rate being 20%, and it is most common in first three to four months after the stroke.

Studies and literatures on post stroke anxiety are very few still remain in its infancy. Studies have concentrated on socio-demographic variables, cognitive

functions and laterality as examined for post stroke depression. Many studies show that there is correlation between anxiety and right hemisphere lesions and also that co-morbid post stroke anxiety and depression are associated with left hemisphere lesions [Astrom, (1996)[17]]. Many studies have shown the relationship between post stroke anxiety, age and gender. Women and younger individuals are more vulnerable to develop post stroke anxiety (Morrison, walter et al 2000[69]), while another study reports no such relationship (Schultz et al).[19]

## REVIEW LITERATURE:

### Amputation:

### Sociodemographic factors:

Several studies have revealed that major depressive disorders and greater depressive symptomatology were more prevalent at lower levels of socioeconomic status [Stansfeld et al 1992]. However, income level of people with an amputation was not related to depressive symptoms [Behel J M et al 2004].

Dunn's[20] assessment of amputees personal profile (138 subjects) using the CES-D for depression and Rosenberg self esteem (RSE) for self esteem assessment showed that young age was closely associated with depression ($p < 0.05$) which could be accounted for by the societal acceptance of activity restriction as one ages, a finding suggested by Williamson and Frank et al[8] studies.

Wald et al[1] concur with Dunn's findings with special reference to Fisher & Hanspal[31] and Livneh's[4] articles who showed that younger amputees secondary to trauma were more prone to develop depression than a loss of limb following

diseases in the elderly population and the percentages are higher for upper limb amputation than lower limb(Cheung et al).

Darnall et al[23] suggested from his cross sectional study conducted through telephone that the presence of co morbidity increased the risk for depression and this rose with the number of co morbidities.

Hanley et[21] al studied 70 individuals over a period of one month post amputation of lower limb, and assessed the level of functioning, pain and coping, etc. On follow up these patients were again assessed at 12 and 24 months of post amputation, Graded Chronic Pain Scale (GCPS) was used to measure the limb pain and pain interference was assessed by using part of the Brief Pain Inventory (BPI). The results showed that the most common physical factor which contributed to the development of depression was the severity of phantom limb pain.

Singh et al[26] studied 105 subjects at a rehabilitation ward by using HADS and showed that factors like age, gender, level of amputation and time since amputation are not the risk factors for developing anxiety and depression. However there was a significant correlation between social-isolation and anxiety ($p<.05$) and also between co-morbidities and depression (<.o1). The authors had given little explanation for their finding.

Dunn[20] in his study mainly concentrated on risk factors like sex, marital status and level of amputation whereas income, employment and education were not reported as risk factors. However this study supports the study of Wald et al. It was later found that apart from young age there were some more risk factors in the psychological and emotional domains that were associated with the development of depression. Individuals who were having less optimistic thinking were more vulnerable for developing depression, as they could not find any meaning in their amputation experience and also they felt to have little control over their treatment. Participants who felt gloomy about the future and could think only about the negative effects, thought it was not of any use in expressing their depressed symptoms as duration increased.

Wald et al further cited the study done by Breakey and Rybarczyk et al[22] with reports showing that negative social support, disturbance in the appearance and social discomfort experienced by social interaction increase the risk of developing depression. Atherton et al demonstrated the findings of depression and self consciousness about their body image among amputees in his study. The explanation given for this was that the individuals having high self consciousness were usually the ones who had more concern about their social contacts. They

were acutely aware of their perceptions, i.e. how they were perceived in the society.

Several studies, including Darnall et al[23] reported that negative social support was the risk factor for developing depression. The study also reported that those individuals who were, immediately after the amputation, single, widowed or separated were more prone to developing depressive symptoms. Also there is an increase rate of depression in individuals living near the poverty line; while higher education reduces the risk of developing depression.

Meyer and Ehde et al reported that past history of depression and psychopathology has been a risk factor for later depressive episodes. Also the study by Meyer's et al shows that pre-morbid personality dysfunction has a greater influence on depression in individuals with hand amputation. Ehde et al[66] reported that past depressive episodes were more indicative than pre-morbid mental state in developing depression. It also reports that social support and sex are the important factors in developing depression and he considers that severe pain experienced by the subjects pre disposes the higher incidence of depression.

However, few studies contradict the above said sentence. Hanley et al suggested in his study that severe pain or pain catastrophizing in individuals decreased the incidence of depression. The authors speculate that such patients, especially in the immediate post amputation period attracted more attention from acquaintances & health care professional and hence the incidence of depression turned out to be lower than in the less attention seeking patients.

Apart from seeking help for pain, Seidel et al[24] & Desmond et al[25] found that subjects in denial avoided discussions about their amputation and were at higher risk for depression both in the acute and long run, this not only had an impact on their mood status but also affected their rehabilitation with avoidance of prosthesis.

**Depression and anxiety:**

Many studies reported that about 20% to 30% amputees develop major depression.

Anxiety is also associated with this depression whereas post traumatic stress disorder may not be attributable to this.

Most of the studies concentrated on prevalence and incidence of depression among the patients with amputation and showed higher rates in comparison to general population, especially soon after the amputation.

An Indian study shows that more than 70% of the individuals with amputation are having depression (Shukla et al)[9]

A study done by Grunert et al., showed that 62.4% individuals had depressive symptoms during the initial period of hand amputation and this was supported by wald et al.[1]

A review by, Horgan et al, cited in Caplan et al reports that about 58% of the individuals had major depression after 18 months post amputation and another study done by Bodenheimer et al showed about 30% depression rate in amputees.

Meyer found that most of the studies on amputees with depression showed about 30% prevalence rate and Seidel et al found similar results among the individuals of amputation. Seidel et al[24] found a similar rate of depression among persons after

the amputation of a lower extremity as opposed to the more socially noticeable upper extremity and hands.

Desmond[25] determined that 28.3% of the subjects had scores to indicate possible MDD and 35.5% qualified for clinical anxiety.

Singh et[26] al did a prospective cohort study on 105 individuals with lower limb amputation at a rehabilitation ward and admitted HADS to each subjects and results showed that 26.7% of them were suffering from depression and 24.8% from anxiety.

A cross-sectional survey done by Atherton et al using 67 individuals with lower limb amputation who were using prosthesis, assessed the long term psychological adjustment and reported 13.4% individuals to be depressed and 29.9% to be anxious.

Several studies have shown high rates of anxiety and depression which is consistent with several previous studies that confirmed high rates of anxiety and depressive symptoms after limb loss with 41% prevalence (Kashani et al[27] 1983;

Schubert et al[29] 1992; Cansever et al 2003[8]; Atherton and Robertson 2006; Seidel et al 2006)[24].

Most studies have found no significant relationship between the time ensuing amputation and psychological disturbances (Rybarczyk et al[22] 1992; Thompson et al 1984)[30]. Horgan and Maclachlan(2004)[10] in their publication on amputation's psychological adjustment concluded that depression and anxiety apparently are higher in the first two years post amputation and thereafter decline to levels prevalent in the general population. Singh and Hunter (2007)[26] in their recent study concluded depression and anxiety symptoms to resolve after in patient rehab for a short duration.

The outcome of amputation could be associated with socio-demographic factors such as gender, age etc. Most of the studies could not establish any relationship between gender and outcome. (Bradway et al[2] 1984; Williamson and Walters 1996). But few studies showed that women who experienced more depression than men performed poorly on emotionally adaptation.(Kashani et al (1983)[27].

Fisher and Hanspal et al (1998)[31] and Livneh et al(1999)[4] reported that individuals with younger age and traumatic amputation are at higher risk for developing major depression than with amputation of surgical aetiology. Other studies could not establish any relationship between cause of amputation and psychological

reactions and its outcome (Shukla et al 1982[9], Weinstein 1985, kashani et al[27] 1983 and Williamson et al 1996).

Studies done by Thompson et al(1984)[30] and Rybarczyk et al (1992,1995)[22], showed that social isolation and low social support leads to higher incidence of depression and the amputee's current family reactions to have a significant effect on adjustment.

Weinstein et al(1985) observed that anxiety, depression ,social discomfort and other psychiatric conditions were not increased in magnitude among patients with above knee amputation in spite of the prognosis being poor in comparison to the below knee amputees also supported by (Shukla et all 1982[9]). O'Toole et al (1984) reported that individuals with Below Knee amputees to be more depressed when compared with above knee amputees because below knee is less severely disabling than Above Knee in terms of functioning.

**Body Dysmorphic Disorder**

Body dysmorphic disorder is excessive pre occupation with the imagined defect in their bodily appearance or an abnormal concern about minor physical anomaly.

A variant of this is the body image disturbance where person does have bodily defects and are excessively concerned about their appearance and needs to be reassured often. They are most commonly seen with occurrence of abrupt changes in

the body such as amputation, brain disease and other conditions. Removal of the body parts especially in amputation is the condition where we can come across such body image disturbance. The patients with emergency amputation or those with other situations which leads to perceivable bodily changes may have profound impact on their psyche, regarding perception of their body image, this might lead to an apprehension regarding social interactions on account of their misinterpretations about the external appearance and perceiving it as a defective and unacceptable change in the cosmetic context.

There is a paucity of literature on body dysmorphic disorder in amputees.

**Post stroke:**

**Sociodemographic profile:**

Studies have been done to correlate the relation between post stroke depression and the various socio-demographic variables albeit unsuccessful. Ouimet et al. 2001[31] concluded that age and gender had no role to play in post stroke depression development while Andersen et al. (1995)[32] showed SES to have no influence. Eriksson et al. 2004[33]; Carota et al. 2005[34] were among the fewer studies which concluded with a positive relation between younger age and post stroke depression.

The prevalence of depression in the general population is higher in women than men hence it would be logical to conclude the same in post stroke scenario but studies do not support this While the results from some studies support the association between female sex and PSD (Desmond et al. 2003[25]; Paradiso & Robinson 1998[35]; Ouimet et al. 2001[32], Eriksson et al., 2004[34], Paolucci et al. 2005[36]), others do not (Ouimet et al. 2001[32]; Berg et al. 2003[37]; Whyte et al[50], Spalletta et al. 2005[38]). However, there may be real differences between men and women in terms of the relative importance of risk factors for PSD. Among men, physical impairment may be a more influential risk factor (Paradiso & Robinson 1998[35]; Berg et al. 2003[37]), while among women, previous history of psychiatric disorder may be more important (Paradiso & Robinson 1998)[35].

**Depression and anxiety:**

The possible explanations for the association between physical illness and depression are- a coincidental relationship (this is least likely), a negative mood reaction to the physical consequences of the stroke- in other words the impact of the physical illness may manifest its effects through the losses it causes to the individual, being a major negative life event (losses to self-esteem, independence,

previously held job, etc.) and a neurotransmitter imbalance as a result of cerebral damage caused by the stroke(has a less likelihood).

Well-documented cases have proven that depression as a sequel to stroke in most cases. Data pooled in from published prevalence studies (Robinson 2003) suggest that the mean prevalence of depression (amongst in-patients in acute or rehabilitation settings) was 18.5% and 19.3% for minor and major depression respectively whilst among individuals in community settings; it was reported to be 14.1% and 9.1% for major and minor depression. Amongst those included in outpatient studies, mean prevalence (reported) was 23.3% for major depression and 15% for minor depression (Robinson 2003). Overall mean prevalence ranged from 31.8% in the community studies to 35.5% in the acute and rehabilitation hospital studies. A relatively recent systematic review of prospective, observational studies of post-stroke depression (Hackett et al 2005)[16] reported that 33% of stroke survivors exhibited depressive symptoms at some time following the occurrence of stroke (acute, medium-term or long-term follow-up).

Estimates of prevalence may be affected by the time duration between stroke onset and assessment. As a matter of fact, the highest rates of incident depression have

been reported in the first month following stroke (Andersen et al 1995[33], Aben et al 2003[40a], Bhogal et al 2004[43], Morrison et al 2005[42], Aben et al 2006)[40b].

Paolucci et al (2005)[36] reported that, out of the 1064 patients included in the DESTRO study, nearly 36% developed depression of which eighty percent of them developed depression within the first three months(post stroke)- (Paolucci et al2005).

The incidence of major depression might significantly decrease over the first 2 years following stroke (Astrom et al)[17] but minor depression tends to persist or rather increase over the aforementioned time period (Burvill et al. 1995[45]; Berg et al. 2003[38], Verdelho et al. 2004[67]). Berg et al (2003)[38] reported nearly one-half of the individuals experiencing depression during the acute phase(post stroke), to see it in the subsequent one and half year; though more women than men have been identified in the acute phase while there is a male predominance in the latter half period (Berg and others 2003)[37].

The study of mood disorders after stroke has focused mainly on depression. Reported prevalence of PSD varies broadly, although most studies place prevalence from 20% to 50%, and indicates that depression persists for 3–6 months post stroke (Parikh, Price, & Robinson, 1991[45]; Hosking, Marsh, & Friedman et al

2000; Morris, & Robinson, 1998[46]; Parikh, Lipsey, Robinson, & Price, 1988[46]; Schubert, et al 1992[28]; Schwartz et al 1993[47]; Starkstein & Robinson, 1991[68]).

PSD has an unconstructive impact on case fatality and rehabilitation (Whyte & Mulsant, 2002)[50], and functional outcomes (Herrmann, Black, Lawrence, Szekely, & Szalai, 1998)[57]. Distinguishingly, PSA has only lately started to be investigated (Castillo, Schultz, & Robinson, 1995[18]; Castillo, Starkstein, Fedoroff & Price, 1993; Chemerinski & Robinson, 2000[53]; Dennis, O'Rourke, Lewis, Sharpe, & Warlow, 2000[54]; Robinson, 1997, 1998; Shimoda & Robinson, 1998[55]) with prevalence information ranging from 4 to 28% (Astrom, 1996[17]; House and others, 1991). As with the case of PSD, the course of PSA has been found to stay on moderately constant up to 3 years post stroke (Astrom, 1996)[17]. Co-morbidity of PSA and PSD is elevated, with as many as 85% of people with generalised anxiety having co-morbid depression during the 3 years time period post stroke (Castillo et al., 1993, 1995)[18].

In the past depression was found to be common in young patients (Neau et al. 1998), while in some recent studies (Sharpe et al. 1994, Kotila et al. 1998) it has been linked to old age. Lack of social support and both functional and cognitive destruction may raise the risk of depressive disorder in the elderly (Sharpe et al1994).

Robinson et al in 1984 studied patients suffering from stroke in 2 groups with relation to onset of depression- faction of patients with acute commencement of depression, within few weeks post stroke and 2nd group with delayed commencement of depression, over 24 months and established no disparity in clinical characteristics or course of depression in the two groups. In 1986 Lapse et al compared a group of patients with PSD with 43 pts with functional depression and concluded that the two groups did not differ in the symptom profile of depression in their study.

Although post-stroke depression (PSD) is a common consequence of stroke, risk factors for the development of PSD have not been clearly delineated. In a recent systematic review, Hackett and Anderson (2005) included data from a total of 21 studies. Of the many different variables assessed, physical disability, stroke severity and cognitive impairment were most consistently associated with depression.

In an earlier review of 9 prospective studies examining post-stroke depression, the risk factors identified most consistently as increasing an individual's risk for post-stroke depression included a past history of psychiatric morbidity, social isolation,

functional impairment, living alone and dysphasia (Ouimet et al. 2001)[32]. Since the time of the Hackett et al. (2005)[16] and Ouimet et al. (2001)[32] reviews, more recent studies have confirmed the importance of severity of initial neurological deficit and physical disability as predictors of the development of depression after stroke (Carota et al. 2005[34], Christensen et al. 2007[79]). In addition, Storor and Byrne (2006) examined post-stroke depression in the acute phase (within14 days of stroke onset) and identified significant associations between prestrike neuroticism (OR = 3.69, 95% CI 1.25 – 10.92) and a past history of mental disorders (OR = 10.26, 95% CI 3.02 – 34.86) and the presence of depressive symptoms.

**Stroke Location and Depression:**

There have been 2 meta-analyses examining this relationship (Singh et al. 1998, Carson et al. 2000).

**Singh et al. (1998)** reviewed 26 original articles done on the relation between lesion location and PSD. In six studies there was no relation between PSD and lesion location, in 2 right sided lesion had higher risk,4 showed left sided to have higher risk and only one study dwelled on non lesion risk factors. Consequently,

Singh et al. (1998) were unable to make any definitive conclusions concerning stroke lesion location and the risk for depression.

**Carson et al. (2000)** did a systematic review on the same. All reports on the association of post stroke depression with location of brain lesions were included in the review. In the majority of the reports included, no significant relationship between the two was found.

**Robinson & Szetela (1981USA)[56]:** 18 patients with left hemispheric stroke were compared to 11 patients with traumatic brain injury for frequency and severity of depression, more than 60% of the stroke patients had clinically significant depression compared with about 20% of the trauma patients.

**Hermann et al. (1995 Germany)[49]:** 47 patients with single demarcated unilateral lesions were selected for study and extensive assessment done showed majority had no significant difference in depression scores irrespective of the side of lesion. Major depression was exhibited only in 9 patients with left hemispheric strokes all involving the basal ganglia. None of the patients with right hemispheric strokes exhibited a major depression.

**Morris et al.(1996a Australia):** 44 first episode stroke patients with single lesions on CT were examined and higher frequency of depressive disorder was demonstrated in those with left hemisphere prefrontal / basal ganglia lesions than other lesions.

Bhogal et al. (2004)[43] meta-analysis showed some evidence that PSD may be related to specific brain site lesions, although it is not evidently clear (Bhogal et al. 2004;).

The John Hopkins Group (Lipsey et al. 1983, Robinson & Szetela 1981[56], Robinson & Price 1982, Robinson et al. 1982, 1983, 1984, 1986, 1987) carried out a series of studies exploring the relationship of PSD to the location of the lesion and found it to be more frequent in left hemispheric lesions. (Robinson & Szetela 1981[56], Robinson & Price 1982[52], Robinson 1986, Robinson et al 1987), the severity of which correlated inversely with the distance of the lesion from the frontal poles and those with subcortical, cerebellar or brainstem lesions had much shorter-lasting depressions than patients with cortical lesions (Starkstein et al. 1987,1988).This correlation has been confirmed by Sinyor et al. (1986)[78] and Eastwood (1989)[73] and only one study showed those with both PSD & PSA had significantly higher frequency of cortical lesions, while patients those with major

depression only had a significantly higher frequency of subcortical (basal ganglia) stroke (Starkstein et al.1987).

While the literature on PSA remains in its infancy, studies have begun to examine its relationship to sociodemographic factors, injury, cognitive, and physical characteristics as those examined for PSD. PSA correlates significantly with right hemisphere especially posterior lesions, while co-morbid PSA and PSD are linked to left hemisphere lesions ( Astrom, 1996[17]). Castillo et al. (1993), Morrison, Johnston, & Walter, 2000[69]; Schultz, Castillo, Kosier, & Robinson, 1997[19] report younger patients (<59 years) are more susceptible to PSA while Dennis et al., 2000[54] report no significant relationship.

Castillo et al (1993, 1995)[18]report that PSA is not significantly correlated with physical functioning, cognitive functioning, or social functioning. While some authors similarly report no significant correlation (Starkstein et al., 1990), others report that anxiety is linked to greater impairment in activities of daily living both acutely and up to 3 years post stroke (Schultz et al., 1997)[19].

To date, few studies have examined both depression and anxiety post stroke, or their differential relationships to these factors.

Suzanne L. Barker-Collo (2007) found in his study the prevalence rates for moderate to severe depression and anxiety in their sample were 22.8 and 21.1%, respectively.

According to Fishman there will be a Body image disturbance in amputees but there is a paucity of literature in this pertaining to the post stroke patients. In amputation body part is destructed, disfigured or removed and in post stroke patient there is a possibility of disabled nature of the body parts.

# AIM AND OBJECTIVES

## AIM

To Compare the Psychiatric profile, Depression and Body Dysmorphic Disorder in patients with Amputation and Post Stroke.

## OBJECTIVES

1. To study the incidence of psychiatric morbidity in patients with amputation and compare it with stroke patients.
2. To compare the incidence of depression in amputees and post stroke subjects.
3. To compare the incidence of anxiety in amputees with that in post stroke patients.
4. To compare Body Dysmorphic Disorder in amputees and post stroke individuals.
5. To compare the socio-demographic variables between patients with amputation and post stroke.

## HYPOTHESIS

1. Depression is same in amputees and post stroke subjects.
2. Anxiety is same in amputees and post stroke individuals.
3. Body Dysmorphic Disorder is same in amputees and post stroke patients.
4. Psychosocial factors between the amputees and post stroke patients are same.

# MATERIALS AND METHODS

## Setting of study

Study was carried out in out-patient and in-patient Department of Orthopaedics, Plastic Surgery, General Medicine at Govt. Stanley Medical College.

## Period of study:

From May 2012 to November 2012 (7months)

## Design of study:

Case –control study

## Selection of sample

A total of 30 patients consecutively chosen, form the sample for cases and consecutive sample of 30 patients with stroke constitute the control group.

Patients were assessed within the period of two to six weeks after amputation and stroke.

**INCLUSION AND EXCLUSION CRITERIA:**

## CASES (PATIENTS WITH AMPUTATION)

**Inclusion criteria:**

Patients who underwent elective as well as emergency amputation.

Age between 18 years to 60 years.

**Exclusion criteria:**

Patients with age less than 18 years and with age more than 60 years

Previous history of psychiatric illness

Patients with history of psychiatric illness before the amputation

Patients with other medical illness

## CONTROLS

**Inclusion criteria:**

Patients with stroke

Age between 18 years to 60 years.

**Exclusion criteria:**

Patients with age less than 18 years and with age more than 60 years

Patients with aphasia and incomprehensive

Previous history of psychiatric illness

Patients with history of psychiatric illness before the onset of stroke

Patients with other medical illness

**Tools used:**

1. A structured interview schedule to study the demographics, clinical features and other relevant factors in history.
2. General Health Questionnaire (GHQ-28)
3. Hospital Anxiety and Depression Scale (HADS)
4. Hamilton Depression rating Scale (HDRS/HAM-D)
5. Yale Brown Obsessive Compulsive Scale for Body Dysmorphic Disorder.(YBOCS-BDD)

**General Health Questionnaire (GHQ 28)**

The GHQ 28 was developed by Goldberg in 1978. Developed as a screening tool to detect those likely to have or to be at risk of developing psychiatric disorder.

GHQ 28 is a 28 item measure of emotional depression in medical settings, through factor analysis GHQ 28 has been divided into 4 subscales.

They are:

Somatic symptoms (1-7)

Anxiety/insomnia (8-14)

Social dysfunction (15-21)

Severe depression (22-28)

Each item is occupied by 4 possible responses not at all, no more than usual, rather more than usual and much more than usual.

There are different methods to score GHQ 28. It can be scored from 0-3 for each response with a total possible score on the ranging from 0-84. Using this method, a total score of 23/24 is the threshold for the presence of distress. Alternatively GHQ 28 can be scored with a binary method where not at all and no more than usual

score 0, and rather more than usual and much more than usual score 1, using this method any score above 4 indicates the presence of distress.

Numerous studies have investigated reliability and validity of the GHQ 28 in various clinical populations. Test-Retest reliability has been reported to be high (0.78+00.09)(Robinson and price(1982) and intra rater and inter rater reliability have both been shown to be excellent (crnballi's 20.9-0.95) . High internal consistencies have also been reported. (Failde and Ramos 2000). GHQ 28 correlates well with the hospital depression and anxiety scale (HADS) (Sakakibara 2009) and other measures of depression (Robinson and price 1982).

**Hospital anxiety and depression scale (HADS)**

HADS was originally developed by Zigmond and Snaitn (1983), it is usually used for assessing the levels of depression and anxiety. Total of 14 items in that 7 items for anxiety and 7 for depression. Each item has sub scoring 0 to 3 and total score ranges between 0 to 21 for each domain and its grouped in to mild 8-10, moderate 11-15 and severe greater or equal to 16.

Internal consistency has been found to be excellent for the anxiety (2-85) and adequate for the depression scale and also has adequate validity for anxiety HADS

gave a specificity of 0.78 sensitivity of 0.9. For depression this gave specificity of 0.78 and sensitivity of 0.83.

**Hamilton Rating Scale for Depression**

M.Hamilton developed this measuring instrument, and this is the most commonly used scale for measuring the severity of depression. The HAMD is an observer rated scale consisting of 17 to 21 items (individually 2 part items, weight and decimal variation). Rating is done based on the clinical assessment and also from information given by close relatives (like wife, father, etc) (family members). The items are scored on either 0-4 spectrum or a 0-2 spectrum.

The HAM-D mainly depends on the clinical technique. Majority of the individuals score 0 on rare items (paranoid symptoms, obsession and depersonalization) the total score usually is the sum of first 17 items.

The strength of the HAMD has good validation and very easy to administer. Its use is limited in individual who have psychiatric disorder other than primary depression.

**Scoring**

0-7 →Normal

8-13 →Mild depression

14-18 →Moderate depression

19-22 →severe depression

Greater than 23 →Very severe depression

**Yale Brown Obsessive compulsive Scale for BDD**

YBOCS is a rating scale used to measure the severity of OCD symptoms.

Scale was developed by Dr.Wayne Goodman and his colleagues and it is a widely used scale both in clinical practice as well as in research.

Modified YBOCS scale is used to measure to severity of symptoms of obsession and compulsion in a patient having pre occupation with perceived defect in appearance (BDD). It is having 12 items and in that 5 questions are on preoccupation, 5 on behaviour with compulsion, one item for avoidance and one item for insight.

It mainly measures on time spent by preoccupation with perceived defect about their appearance; distress developed due to defect, interference in functioning and measures compulsive behaviour.

YBOCS-BDD rated on 5 point likert scale, greater the score, higher the psychopathology.

Score on this 12 items ranges from 0-48 and YBOCS-BDD has good inter rated, test retest reliability and good internal consistency. First 3 items in the scale is shows the diagnostic criteria for BDD(DSM IV).

The advantage or BDD-YBOCS is that it assists in comparing clients across studies. It is based on the YBOCS and is therefore bound to a model of an obsessive compulsive spectrum disorder. An important difference between YBOCS BDD and YBOCS for OCD is that the thoughts about the body defect combine the rating for both the stimulus and cognition response. In OCD rumination would be rated under the compulsion.

**Procedure**

A total of 30 patients with amputation consecutively chosen form the sample for cases and a concurrent sample of 30 patients with stroke constitute the control group who after filling the exclusion and inclusion criteria were taken for study. A written informed concern was obtained. HAMD, BPRS, HADS, GHQ-28,YBOCS-BDD scales were administered after clinically evaluation.

**Ethical committee approval**

The study was submitted for ethical committee approval at Govt. Stanley hospital and approval was obtained.

**Statistical method**

The data was analysed using SPSS and appropriate statistical test such as t test, chi square test were employed.

The socio-demographical profile and HAMD, YBOCS-BDD, HADS, GHQ-28 scales were given in frequencies with their percentage. HAMD, HADS, GHQ-28, YBOCS-BDD scores difference between cases and controls were analyzed.

Incidence of psychiatric morbidity in amputees and stroke patients was given with percentage 95% confidence interval.

# OBSERVATIONS AND RESULTS:

## A) Socio-demographic characteristics of cases and control groups.

**TABLE 1**

**AGE DISTRIBUTION**

| Age Group | Amputation | | Post Stroke | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 20 - 25 | 3 | 10.00 | 0 | - | 3 | 5.00 |
| 25 – 35 | 11 | 36.70 | 2 | 6.70 | 13 | 21.70 |
| 35 – 45 | 7 | 23.30 | 5 | 16.70 | 12 | 20.00 |
| 45- 55 | 3 | 10.00 | 6 | 20.00 | 9 | 15.00 |
| 55- 60 | 6 | 20.00 | 17 | 56.70 | 23 | 38.30 |
| Total | 30 | 100 | 30 | 100 | 60 | 100 |

**Mean Age**

| | Amputation | Post Stroke |
|---|---|---|
| Mean | 39.17 | 52.13 |
| Sd | 13.43 | 9.61 |
| t-Value | **4.30** | |
| Df | **58** | |
| p-value | **0.000 ( Significant )** | |

The population with age group more than 18 and less than 60 were included in the study. There was significance difference in the age distribution between the cases and control group (p=0.00) with mean age 39.17 in cases and 52.13 in controls.

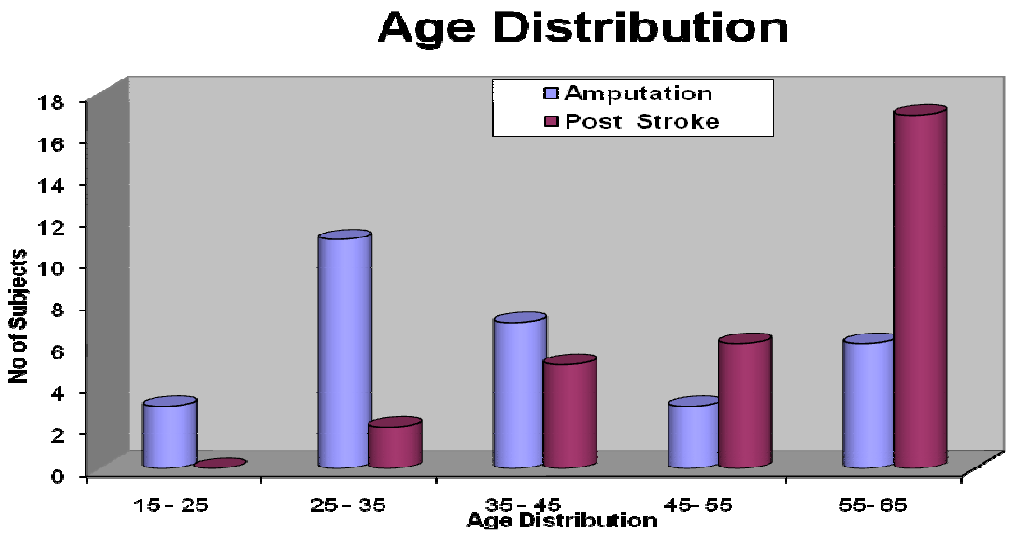


**TABLE-2**

**SEX DISTRIBUTION OF THE SAMPLE**

| Sex | Amputation | | Post Stroke | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Male | 25 | 83.30 | 17 | 56.70 | 42 | 70.00 |
| Female | 5 | 16.70 | 13 | 43.30 | 18 | 30.00 |
| Total | 30 | 100 | 30 | 100 | 60 | 100 |
| Chi-square value | **5.08** | | | | | |
| Df | **1** | | | | | |
| p value | **0.02 (Significant)** | | | | | |

There was significance statistical difference between cases and control in sex distribution (0.02). Males predominated in cases (83.3%) than females (16.7) as compared to control.

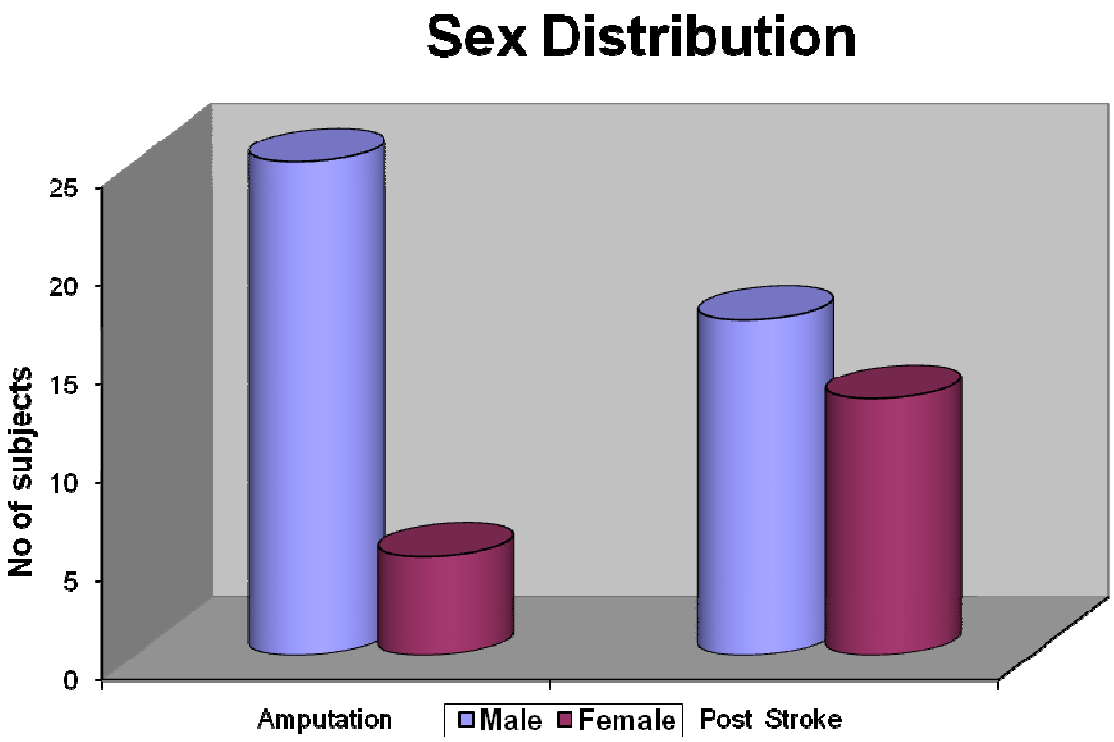

Sex Distribution
No of subjects
25
20
15
10
5
0
Amputation
Male
Female
Post Stroke

**TABLE-3**

**OCCUPATIONAL STATUS**

| Occupation | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Semi Skilled | 20 | 66.66 | 12 | 40 |
| Skilled | 7 | 23.33 | 6 | 20 |
| dependent | 3 | 10 | 11 | 36.66 |
| Retired | 0 | - | 1 | 3.33 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **7.65** | | | |
| **Df** | **3** | | | |
| **p-value** | **0.05 ( Significant )** | | | |

There was a significant statistical difference in occupation status between the cases and control (0.05). More number of individuals were unemployed or dependent in control group as compared with cases.

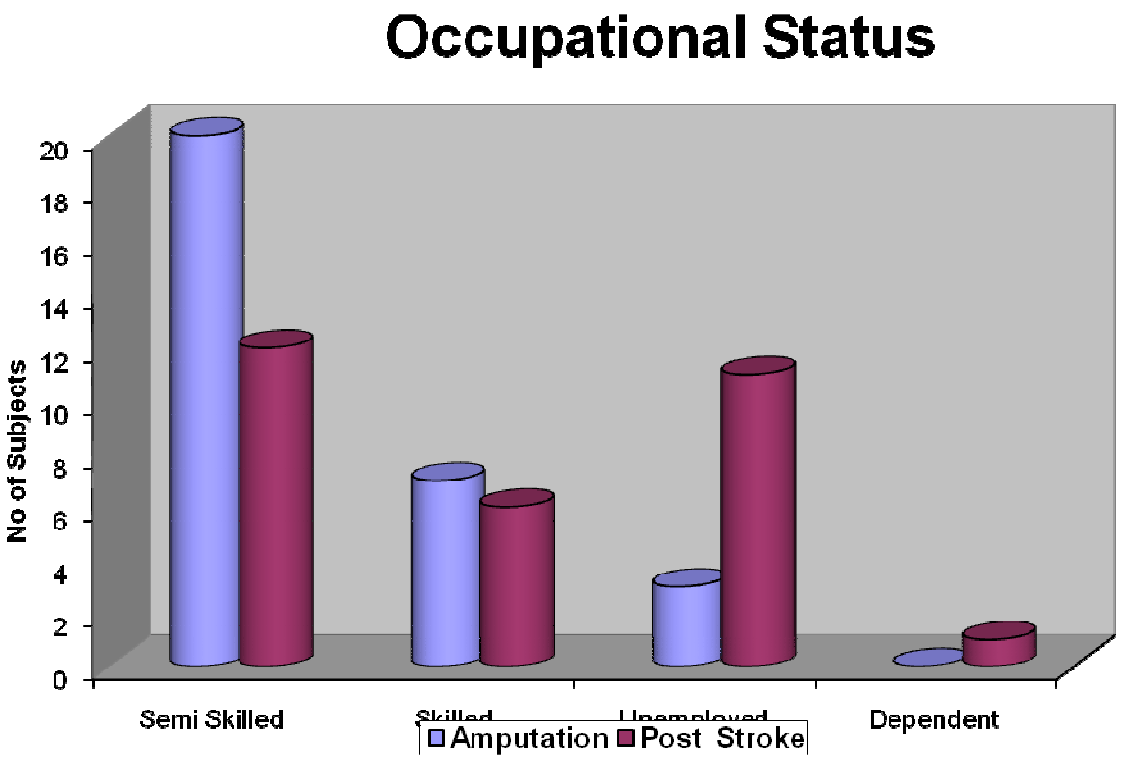

Occupational Status
No of Subjects
20
18
16
14
12
10
8
6
4
2
0
Semi Skilled
Dependent
Amputation
Post Stroke

**Table-4**

**RELIGION**

| Religion | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Hindu | 27 | 90.00 | 26 | 86.66 |
| Christian | 3 | 10.00 | 0 | - |
| Muslim | 0 | - | 4 | 13.33 |
| **Total** | **30** | | **30** | |
| **Chi-square** | **6.004** | | | |
| **Df** | **2** | | | |
| **p-value** | **0.054(Not Significant )** | | | |

Among the religion, there was no significant statistical difference between cases and controls. Hindu's constitute highest percentage among the cases and controls.

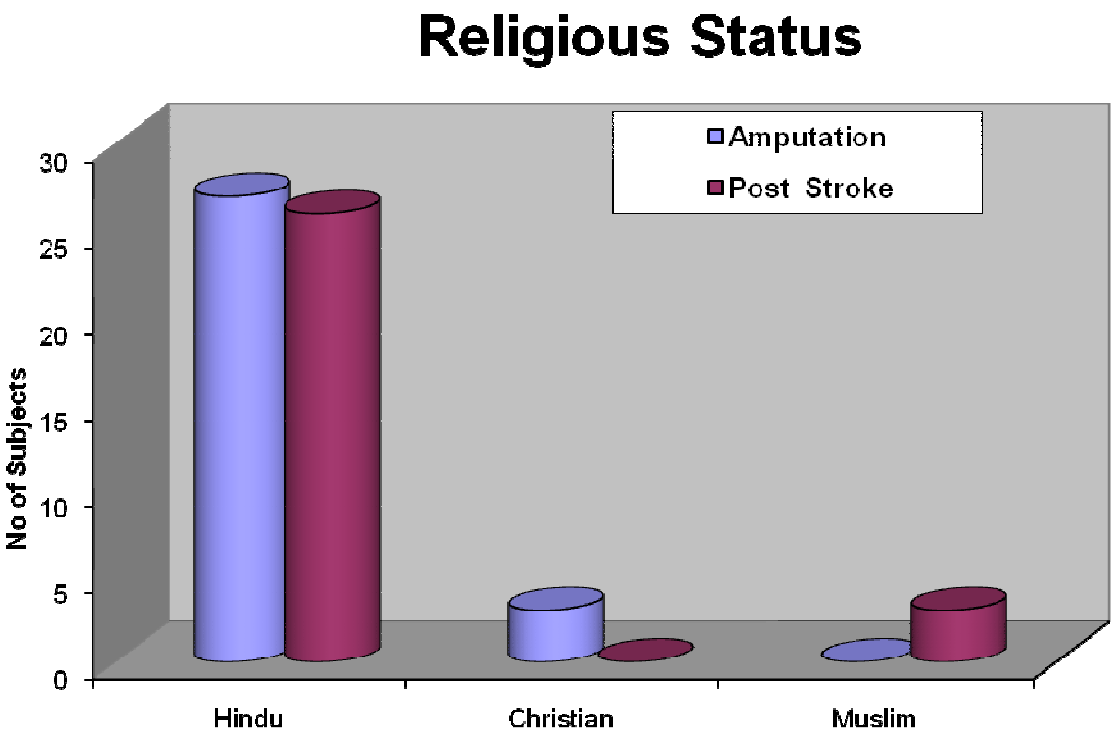

Religious Status
Amputation
Post Stroke
No of Subjects
30
25
20
15
10
5
0
Hindu
Christian
Muslim

**TABLE-5**

**LOCALITY**

| Religion | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Rural | 13 | 43.30 | 6 | 20.00 |
| Semi Urban | 8 | 26.70 | 11 | 36.70 |
| Urban | 9 | 30.00 | 13 | 43.30 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **3.78** | | | |
| **Df** | **2** | | | |
| **p-value** | **0.15 ( Not Significant )** | | | |

Most of the cases were belonging to rural area (43.3%) but, there was no significant statistical difference in locality between cases and controls.

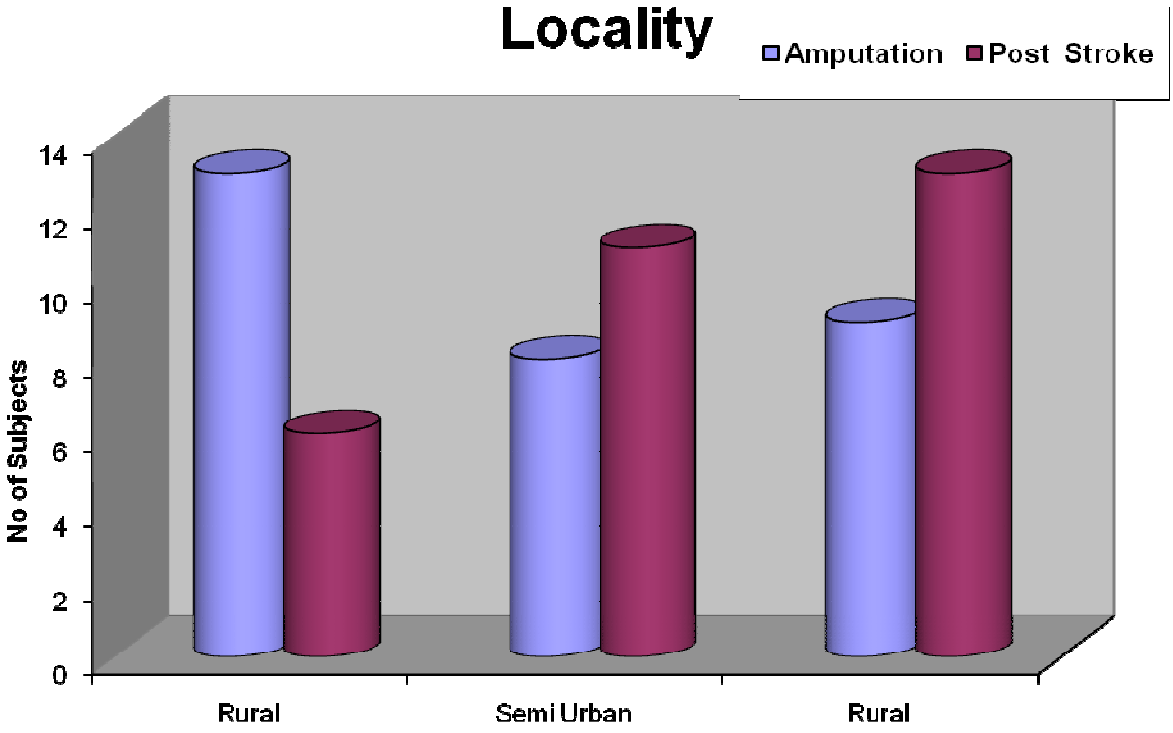

Locality
Amputation
Post Stroke
No of Subjects
14
12
10
8
6
4
2
0
Rural
Semi Urban
Rural

**TABLE-6**

**EDUCATION**

| Education | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Illiterate | 6 | 20.00 | 10 | 33.30 |
| Primary | 12 | 40.00 | 10 | 33.30 |
| High School | 8 | 26.70 | 8 | 26.70 |
| Higher Secondary | 3 | 10.00 | 1 | 3.30 |
| Graduation | 1 | 3.30 | 1 | 3.30 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **2.18** | | | |
| **Df** | **4** | | | |
| **p-value** | **0.70 ( Not Significant )** | | | |

There was no significant statistical difference in educational status between the cases and controls. Majority were belonging to low literacy.

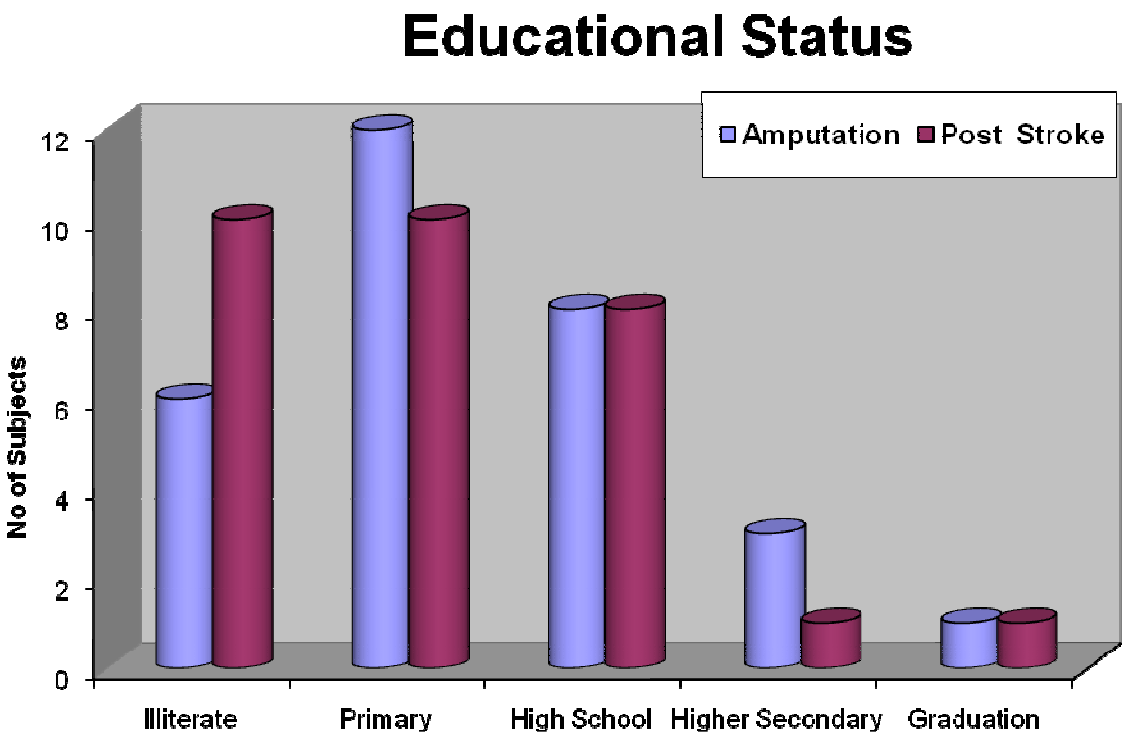

Educational Status
Amputation
Post Stroke
No of Subjects
0
2
4
6
8
10
12
Illiterate
Primary
High School
Higher Secondary
Graduation

**Table-7**

**Socio Economics Status**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| ≤ 1000 | 1 | 3.30 | 6 | 20.00 |
| 1000 – 5000 | 22 | 73.30 | 16 | 53.30 |
| 5001-10000 | 7 | 23.30 | 8 | 26.70 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **4.59** | | | |
| **Df** | **2** | | | |
| **p-value** | **0.10 ( Not Significant )** | | | |

There was no significant statistical difference in socioeconomic status between the cases and controls.

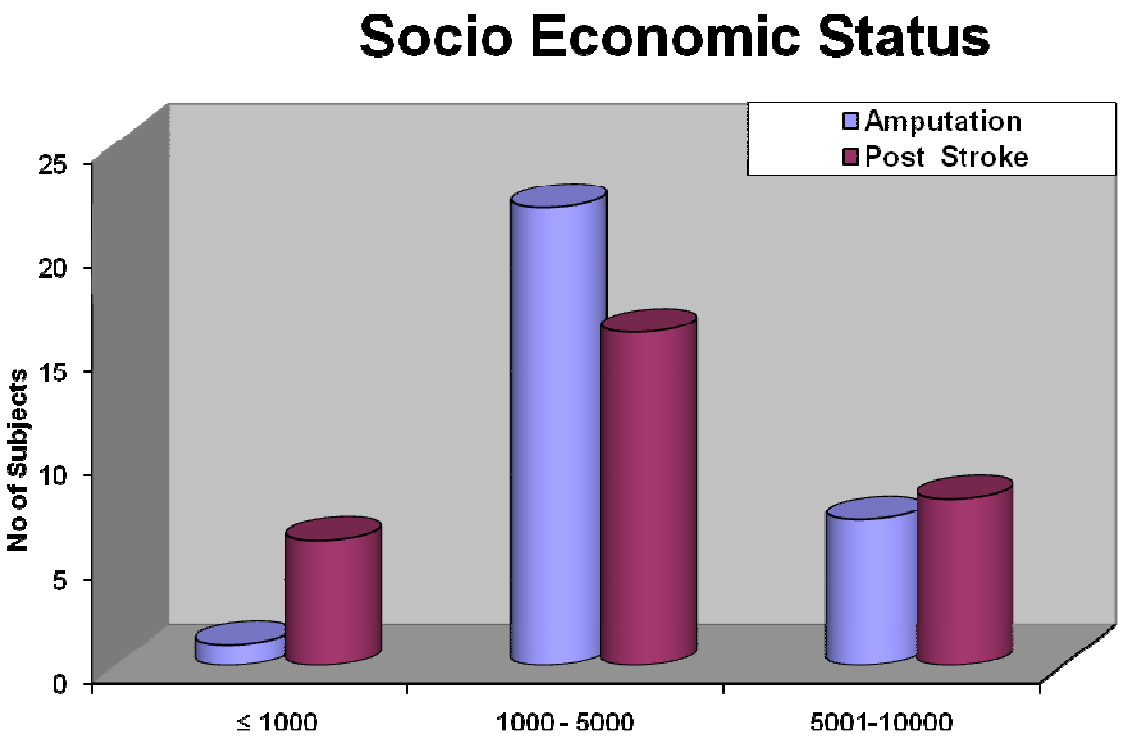

Socio Economic Status
Amputation
Post Stroke
No of Subjects
25
20
15
10
5
0
≤ 1000
1000 - 5000
5001-10000

**TABLE-8**

**FAMILY TYPE**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Nuclear | 28 | 93.30 | 27 | 90.00 |
| Joint | 2 | 6.70 | 3 | 10.00 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **0.22** | | | |
| **Df** | **1** | | | |
| **p-value** | **0.64 ( Not Significant )** | | | |

There was no significant statistical difference in family type between cases and controls.

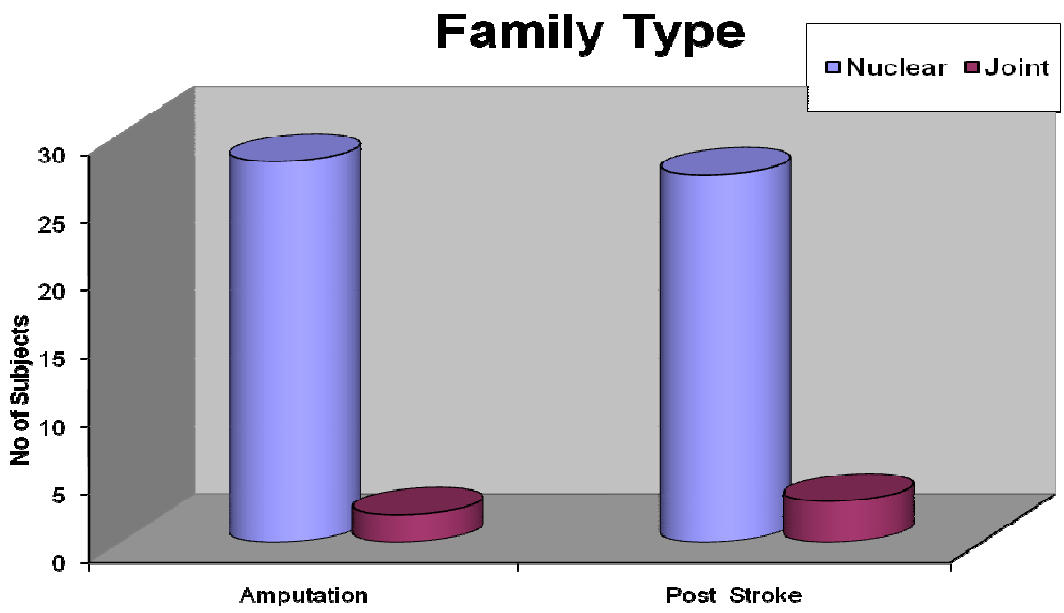


**TABLE-9**

**MARITAL STATUS**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Married | 22 | 73.30 | 18 | 60.00 |
| Unmarried | 6 | 20.00 | 2 | 6.70 |
| Divorced | 0 | - | 1 | 1.70 |
| Separated | 1 | 3.30 | 0 | - |
| Widowed | 1 | 3.30 | 9 | 30.00 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **10.80** | | | |
| **Df** | **4** | | | |
| **p-value** | **0.03 ( Significant )** | | | |

There was a significant statistical difference in marital status between the cases and controls. In cases majority were married (73.3%) and unmarried (20%), in controls (60%) were married and 30% were widowed.

# Marital Status

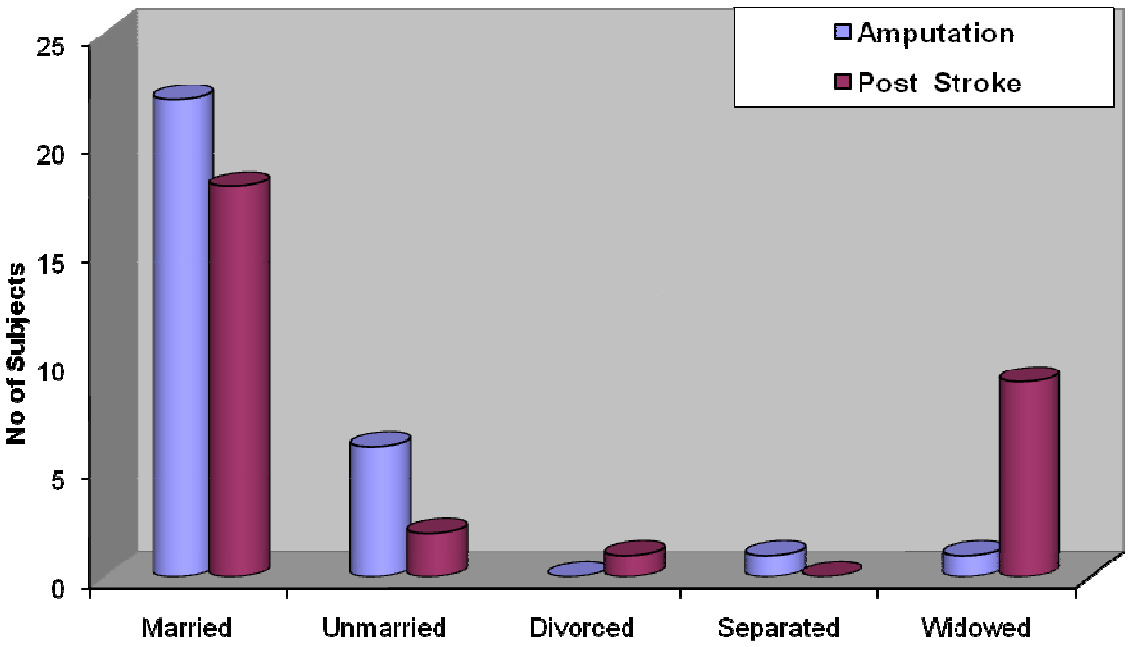


**TABLE-10**

**RANK IN FAMILY**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Earning Member | 25 | 83.30 | 18 | 60.00 |
| Non Earning Member | 5 | 16.70 | 12 | 40.00 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **4.02** | | | |
| **Df** | **1** | | | |
| **p-value** | **0.045 ( Significant )** | | | |

There was significant statistical difference in family rank between cases and controls. In cases majority were earning members (83.3%) and 16% non earning members in comparison with controls where 60% were earning members and 40% belong to non earning group.

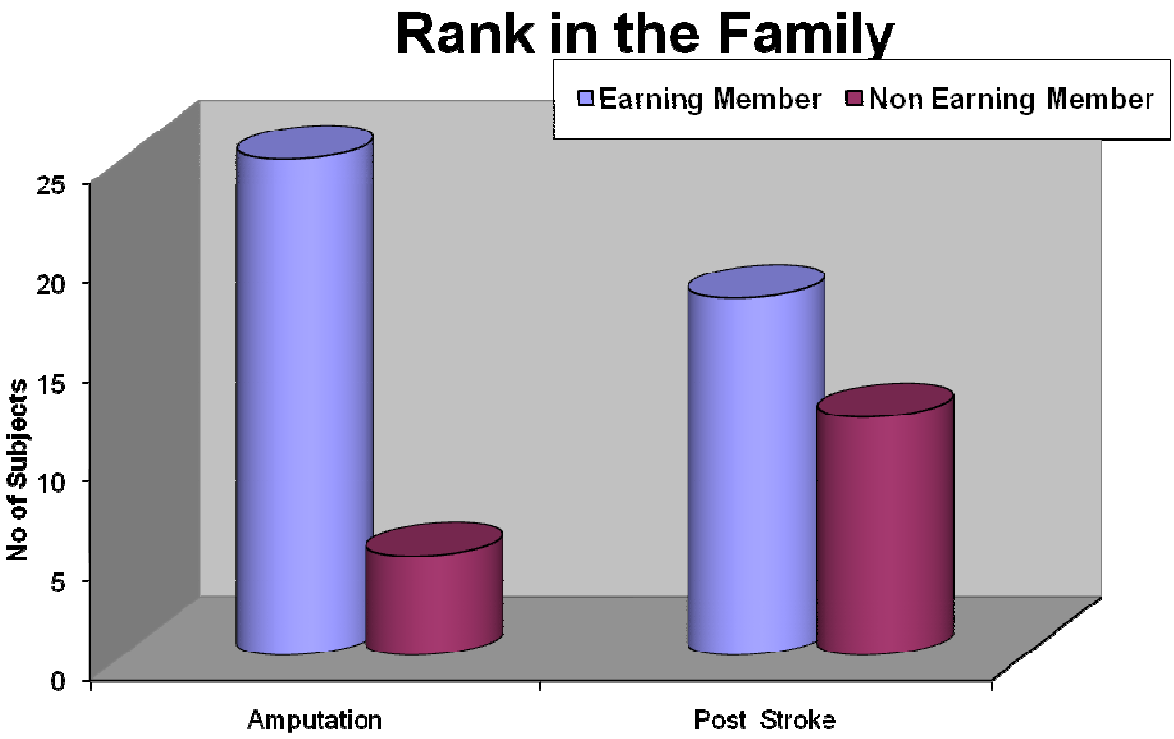

Rank in the Family
Earning Member
Non Earning Member
No of Subjects
25
20
15
10
5
0
Amputation
Post Stroke

**TABLE-11**

**AMPUTATION LEVEL**

| | Amputation | |
|---|---|---|
| | Number | Percentage |
| Rt. AE | 1 | 3.33 |
| Rt. BE | 1 | 3.33 |
| Rt. AK | 3 | 10.00 |
| Rt. BK | 15 | 50.33 |
| Lt. AE | 0 | 00 |
| Lt. BE | 1 | 3.33 |
| Lt. AK | 2 | 6.7 |
| Lt. BK | 7 | 23.33 |
| Total | **30** | **100** |

In cases majority were with lower limb amputation 90% and in that 81.48% were below knee amputation and 18.52% were above knee amputation.

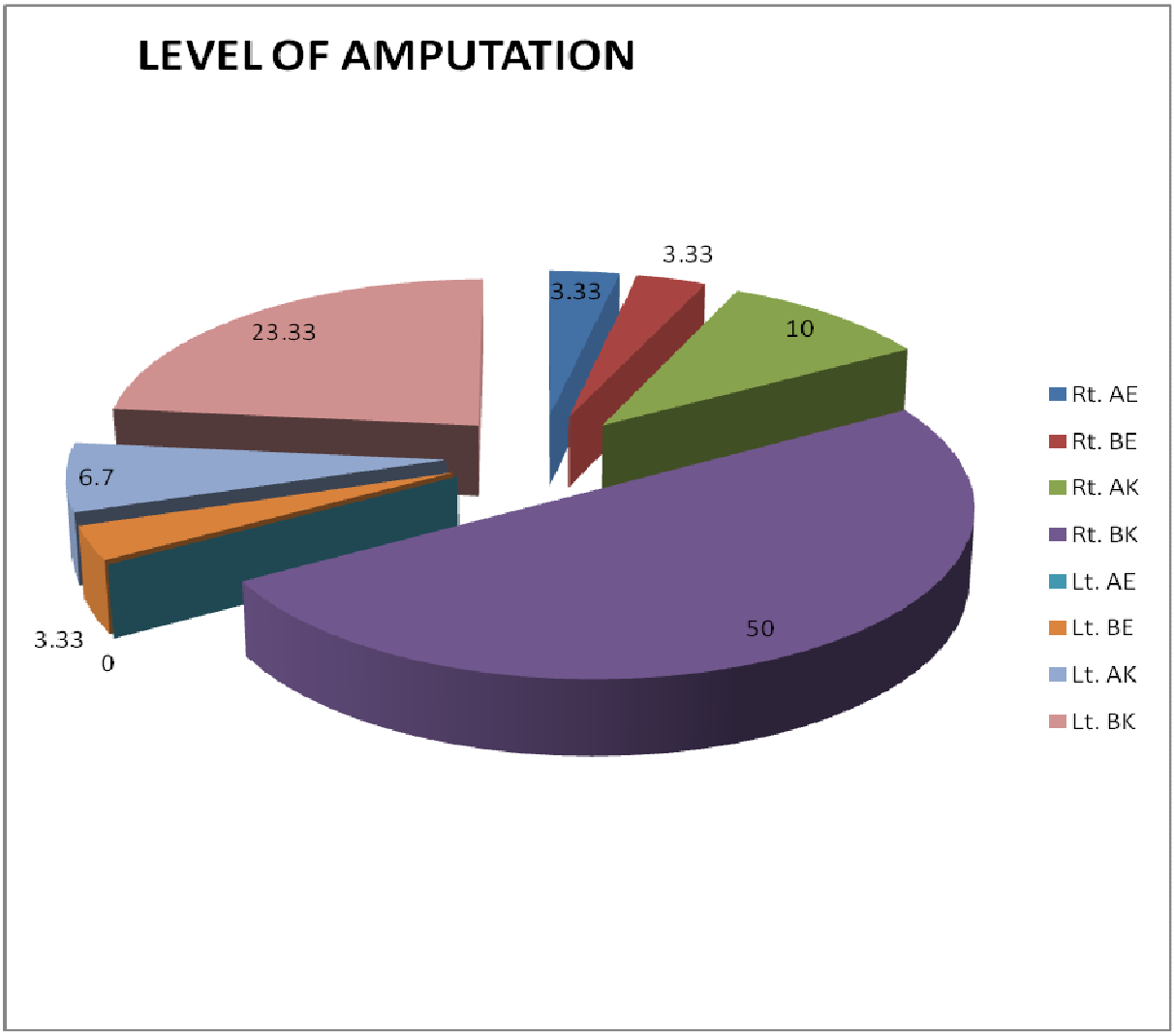

LEVEL OF AMPUTATION
3.33
3.33
10
23.33
6.7
3.33
0
50
Rt. AE
Rt. BE
Rt. AK
Rt. BK
Lt. AE
Lt. BE
Lt. AK
Lt. BK

**TABLE 12**

**FUNCTIONAL DIAGNOSIS OF STROKE.**

| side involved | Type | frequency | percentage |
|---|---|---|---|
| Rt. | Hemiparesis | 5 | 16.7 |
| Rt. | Hemiplegia | 5 | 16.7 |
| Lt. | Hemiparesis | 10 | 33.3 |
| Lt. | Hemiplegia | 6 | 20 |
| Rt. | Facio-brachial monoparesis | 1 | 3.3 |
| Lt. | Facio-brachial monoparesis | 3 | 10 |
| Total | | 30 | 100 |
| Total –Rt | | 11 | 36.7 |
| Total-Lt | | 19 | 63.3 |

Among the stroke patient majority were having left sided weakness 63.3% and 36.7% were having right sided weakness.

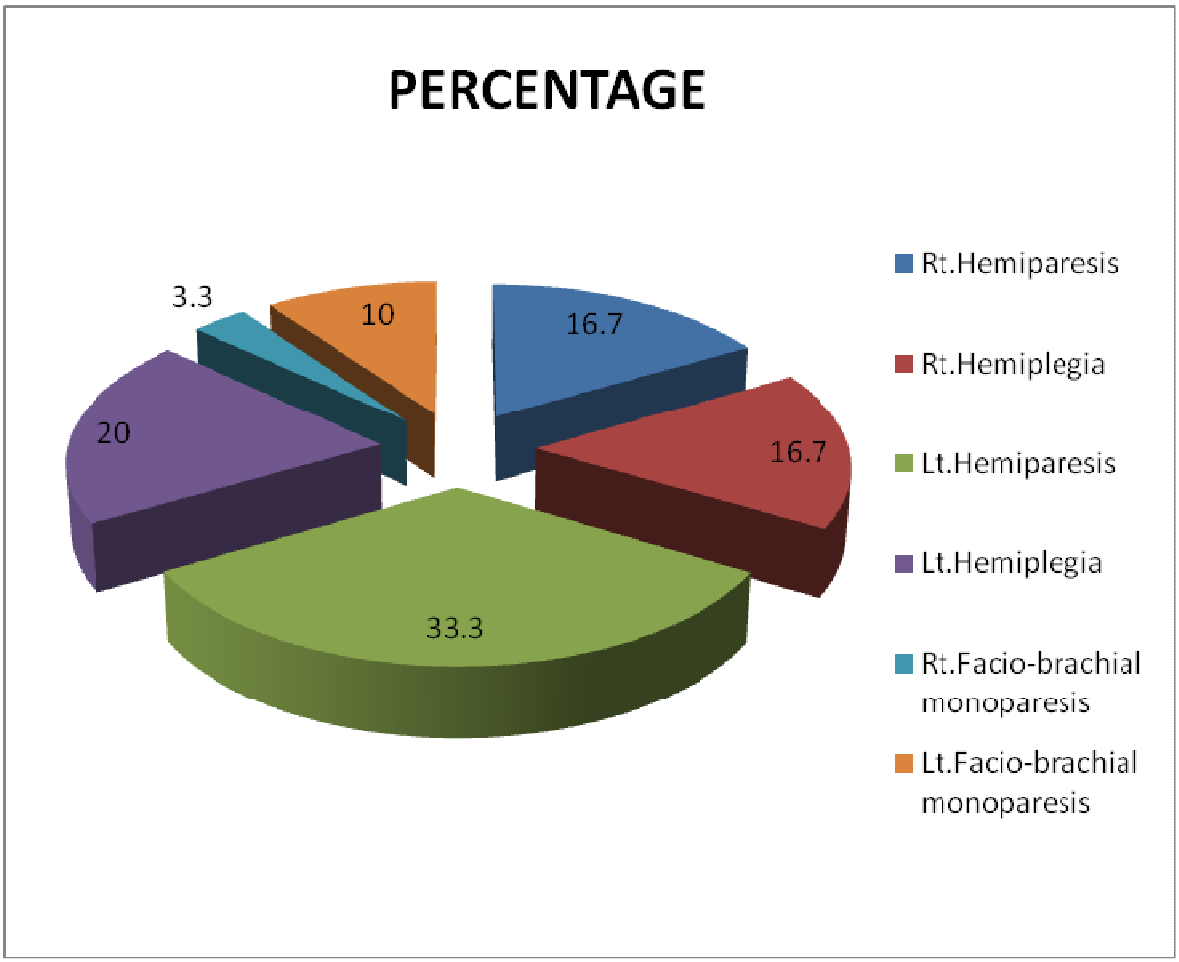

PERCENTAGE
3.3
10
16.7
20
16.7
33.3
Rt.Hemiparesis
Rt.Hemiplegia
Lt.Hemiparesis
Lt.Hemiplegia
Rt.Facio-brachial monoparesis
Lt.Facio-brachial monoparesis

**TABLE-13**

**SOCIAL SUPPORT**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Negative | 3 | 10.00 | 6 | 20.00 |
| Positive | 27 | 90.00 | 24 | 80.00 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **1.18** | | | |
| **Df** | **1** | | | |
| **p-value** | **0.28 ( Not Significant )** | | | |

There was no significant statistical difference in social support between the cases and controls.

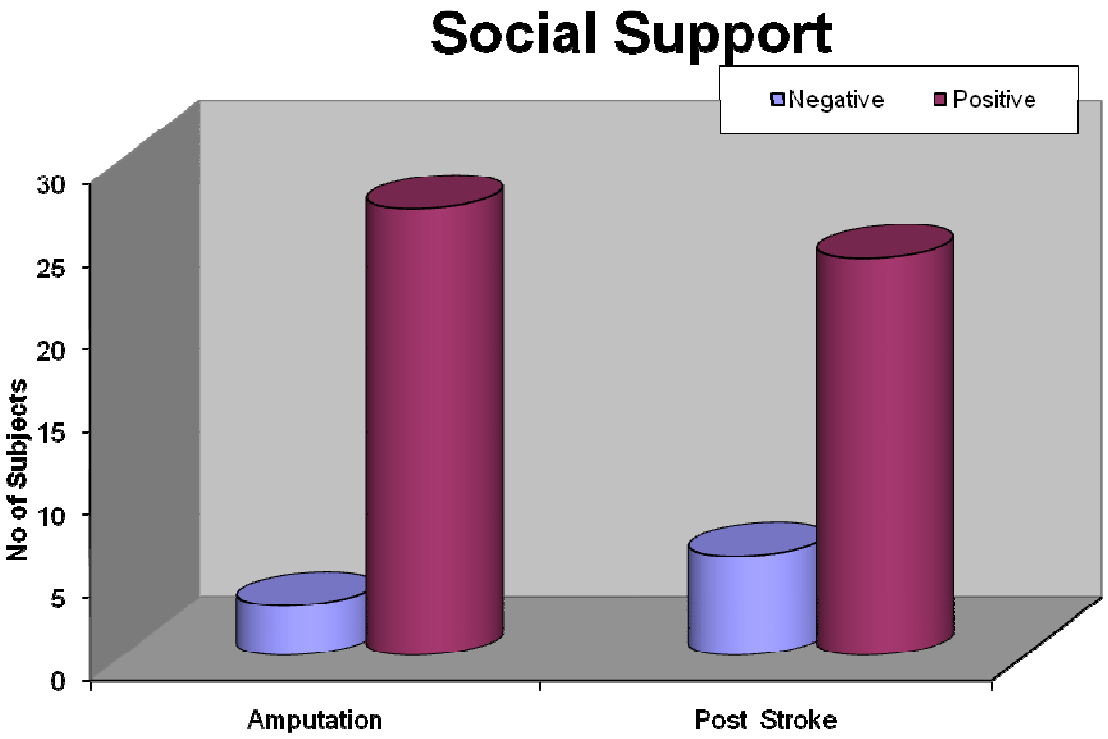

Social Support
Negative
Positive
No of Subjects
30
25
20
15
10
5
0
Amputation
Post Stroke

**Table-14**

**PREVIOUS PHYSICAL ILLNESS**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| DM | 0 | - | 4 | 13.33 |
| HTN | 1 | 3.30 | 9 | 30.00 |
| DM + HTN | 0 | - | 5 | 16.70 |
| Asthma | 4 | 13.33 | 1 | 3.30 |
| ARF | 0 | | 1 | 3.30 |
| Cancer | 0 | | 0 | - |
| NIL | 25 | 83.30 | 10 | 33.30 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **24.83** | | | |
| **Df** | **6** | | | |
| **p-value** | **0.000 ( Significant )** | | | |

There was significant statistical difference in past physical illness between the cases and controls. Majority of the controls were having DM and HTN as compared to the cases.

**TABLE-15**

**SUBSTANCE USE**

| | Amputation | | Post Stroke | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Alcohol | 20 | 66.70 | 15 | 50.00 |
| Nil | 10 | 33.30 | 15 | 50.00 |
| **Total** | **30** | **100** | **30** | **100** |
| **Chi-square** | **1.71** | | | |
| **Df** | **1** | | | |
| **p-value** | **0.19 (Not Significant )** | | | |

Among the cases and controls majority individuals were alcoholics but this was not significant statistical.

**TABLE 16**

**SPECIFIC PSYCHIATRIC MORBIDITY**

| Specific psychiatric morbidity | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Amputation | | Post stroke | | p value |
| | | | n | % | N | % | |
| 1 | Depression | HADS-D | 22 | 73.3 | 19 | 63.3 | t = 2.9284<br>p = **0.031** |
| | | HAM-D | 29 | 96.7 | 23 | 76.66 | t=2.92<br>p=**0.0049** |
| 2 | Anxiety | | 11 | 36.6 | 2 | 7.7 | t = 2.9353<br>p = **0.0048** |
| 3 | BDD | | 2 | 6.7 | 0 | 0 | t = 1.7818<br>p = 0.0800 |

Among the cases, 73.3% were showing high score on HADS-D and 96.7% were showing abnormal score on HAM-D. And 6.7 % were showing abnormal score on YBOCS- BDD.

**Table 17**

**GHQ -28**

| GHQ28 | Amputation<br>Mean ± SD | Post Stroke<br>Mean ± SD | t-value | (Df=58)<br>p-value |
|---|---|---|---|---|
| **A** | 15.90 ± 1.49 | 15.70 ± 1.12 | 0.59 | 0.56 |
| **B** | 16.90 ± 1.99 | 15.77 ± 1.01 | 2.79 | **0.01*** |
| **C** | 15.77 ± 2.89 | 14.90 ± 1.09 | 1.87 | 0.07 |
| **D** | 17.23 ± 2.24 | 15.67 ± 1.47 | 3.20 | **0.002*** |

* Significant

There was significant difference in the anxiety and depression domains of GHQ-28 scale between cases and controls. Scores were high in cases than controls.

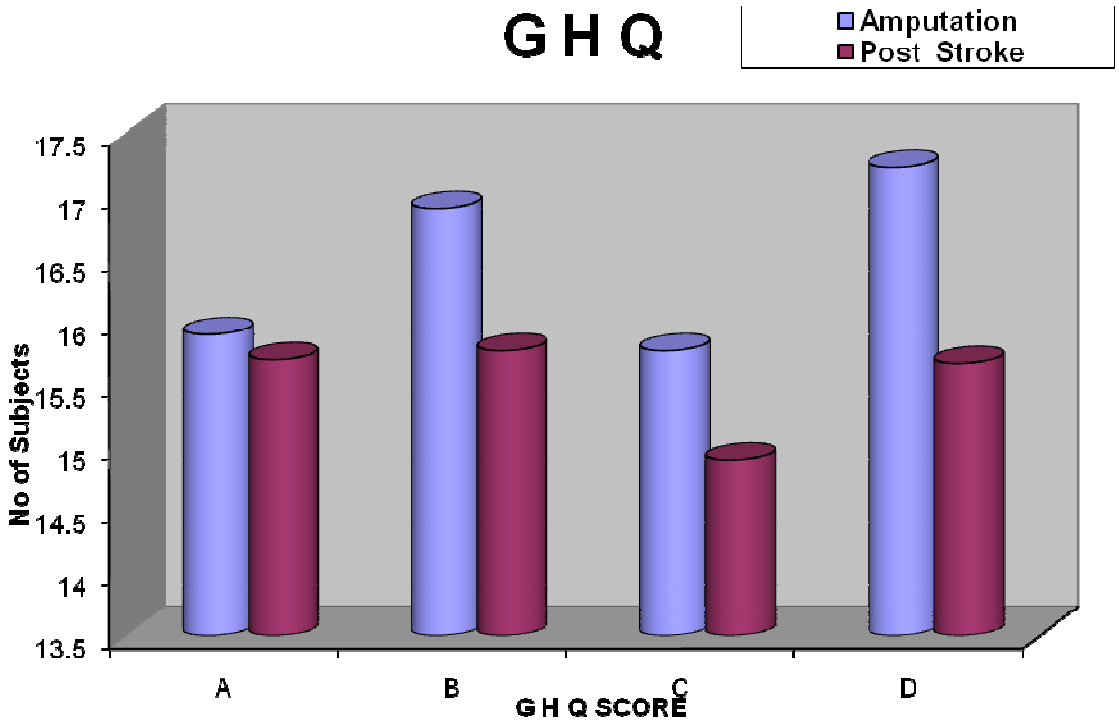

G H Q
Amputation
Post Stroke
17.5
17
16.5
16
15.5
15
14.5
14
13.5
No of Subjects
A
B
C
D
G H Q SCORE

**Table 18**

**HADS scoring**

| | HADS | | | | |
|---|---|---|---|---|---|
| | | | Amputation | Post stroke | |
| 1 | HADS - A | MEAN | 6.200 | 3.700 | t = 2.9353 |
| | | SD | 4.1223 | 2.1838 | p = **0.0048** |
| 2 | HADS - D | MEAN | 12.200 | 8.06 | t = 2.2100 |
| | | SD | 4.01 | 3.44 | p = **0.0311** |
| 3 | HADS TOTAL | MEAN | 16.066 | 11.766 | t = 2.7564 |
| | | SD | 6.812 | 5.157 | p = **0.0078** |

There was significant statistical difference between the cases and controls in HADS scoring.

**TABLE 19**

**HAM D SCORING**

| **HAM – D** | | | | | |
|---|---|---|---|---|---|
| | Amputation | | Post stroke | | |
| | n | % | n | % | |
| Normal | 1 | 3.3 | 7 | 23.3 | t = 2.9284<br>p = **0.0049** |
| Mild | 13 | 43.33 | 17 | 56.66 | |
| Moderate | 12 | 40 | 5 | 16.6 | |
| Severe | 2 | 6.66 | 0 | 0 | |
| Very severe | 2 | 6.66 | 1 | 3.33 | |

There was significant difference in the HAM-D scoring between the cases and controls. Among cases 43.3% were belonging to milder category and 53.2% were belonging to moderate to severe depression. But in cases 19.9% were belonging to severe depression.

**Table 20**

**YBOCS_BDD Scoring**

| YBOCS-BDD | | | |
|---|---|---|---|
| | Amputation | Post stroke | |
| Mean | 3.800 | 2.33 | t = 1.7818 |
| SD | 4.3975 | 0.9942 | p = 0.0800 |

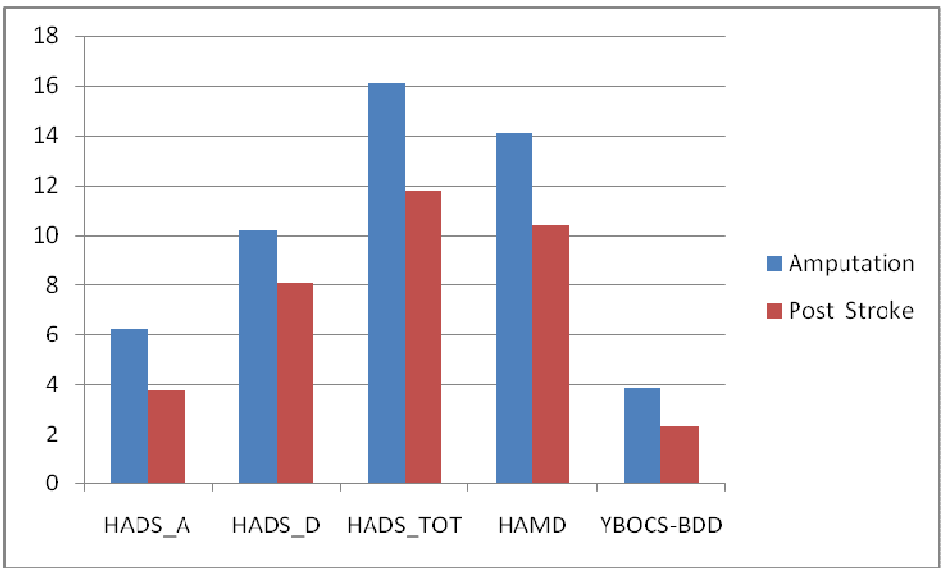
There was no significant statistical difference in YBOCS-BDD scoring between the cases and controls.

**TABLE-21**

**SCORES ON SCALES**

| GHQ | Amputation<br>Mean ± SD | Post Stroke<br>Mean ± SD | t-value | (Df=58)<br>p-value |
|---|---|---|---|---|
| HADS_A | 6.20 ± 4.12 | 3.70 ± 2.18 | 2.94 | **0.01*** |
| HADS_D | 10.20 ± 4.01 | 8.07 ± 3.44 | 2.21 | **0.03*** |
| HADS_TOT | 16.07 ± 6.81 | 11.77 ± 5.16 | 2.76 | **0.01*** |
| HAM-D | 14.07 ± 5.38 | 10.37 ± 4.36 | 2.93 | **0.0049*** |
| YBOCS-BDD | 03.80 ± 4.40 | 2.33 ± 0.99 | 1.78 | 0.08 |

* Significant



SOCIODEMOGRAPHIC VARIABLES

| **Variables** | | **Amputation** | | **Post Stroke** | | **Statistical Analysis** |
|---|---|---|---|---|---|---|
| | | n | % | n | % | |
| Age | MEAN | 39.166 | | 52.13 | | t = 4.3020 |
| | SD | 13.426 | | 9.605 | | p = 0.0001 SIG |
| Sex distribution | Male | 25 | 83.30 | 17 | 56.70 | $\chi^2$ = 5.08 |
| | Female | 5 | 16.70 | 13 | 43.30 | p = 0.02 SIG |
| Occupational status | Semi Skilled | 20 | | 12 | | $\chi^2$ = 7.65 |
| | Skilled | 7 | | 6 | | p = 0.05 |
| | Unemployed/dependent | 3 | | 11 | | SIG |
| | Retired | 0 | | 1 | | |
| Religion | Hindu | 27 | 90.00 | 26 | 86.66 | $\chi^2$ = 6.004 |
| | Christian | 3 | 10.00 | 0 | - | p = 0.054 |
| | Muslim | 0 | - | 4 | 13.33 | NS |
| Locality | Rural | 13 | 43.30 | 6 | 20.00 | $\chi^2$ = 3.78 |
| | Semi Urban | 8 | 26.70 | 11 | 36.70 | p = 0.15 |
| | Urban | 9 | 30.00 | 13 | 43.30 | NS |
| Education | Illiterate | 6 | 20.00 | 10 | 33.30 | |
| | Primary | 12 | 40.00 | 10 | 33.30 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | High School | 8 | 26.70 | 8 | 26.70 | $\chi^2 = 2.18$ |
| | Higher Secondary | 3 | 10.00 | 1 | 3.30 | p = 0.70 |
| | Graduation | 1 | 3.30 | 1 | 3.30 | NS |
| Socio economics status | ≤ 1000 | 1 | 3.30 | 6 | 20.00 | $\chi^2 = 4.59$ |
| | 1000 - 5000 | 22 | 73.30 | 16 | 53.30 | p = 0.10 |
| | 5001-10000 | 7 | 23.30 | 8 | 26.70 | NS |
| Family type | Nuclear | 28 | 93.30 | 27 | 90.00 | $\chi^2 = 0.22$ |
| | Joint | 2 | 6.70 | 3 | 10.00 | p = 0.64 |
| | | | | | | NS |
| Marital status | Married | 22 | 73.30 | 18 | 60.00 | $\chi^2 = 10.80$ |
| | Unmarried | 6 | 20.00 | 2 | 6.70 | p = 0.03 |
| | | | | | | SIG |
| | Divorced | 0 | - | 1 | 1.70 | |
| | Separated | 1 | 3.30 | 0 | - | |
| | Widowed | 1 | 3.30 | 9 | 30.00 | |
| Rank in family | Earning Member | 25 | 83.30 | 18 | 60.00 | $\chi^2 = 4.02$ |
| | Non Earning Member | 5 | 16.70 | 12 | 40.00 | p = 0.045 |
| | | | | | | SIG |
| Social support | Negative | 3 | 10.00 | 6 | 20.00 | $\chi^2 = 1.18$ |
| | Positive | 27 | 90.00 | 24 | 80.00 | p = 0.28 |
| | | | | | | NS |

# DISCUSSION

## SOCIO DEMOGRAPHIC VARIABLES

In our study males are more than the females (25). 83.3% males and 16.7 % females (5) as compare to the control group which was 56.7 males and 43.3% are females this was statistically significant which is similar to the other studies done by Imtiyaz, mansoor et al (2010)[80] and majority of males in the adult age group with the mean age of 39.6, as compared with the controls in which mean age was 52.13.

This is similar with the previous studies done by JO Oladiji, srakimbo et al[61] 2009. The reason for this could be the area being industrialized and young people are more exposed to violent situation than elder once and being a male dominant society, males are the main earners and susceptible to get exposed to the external world.

This finding similar to the previous study done by Ebrahim zadeh et al and shukla et al[9] and cavanagh et al [79] reported in this study that 75% ever males.

In controls reason for the elder age to stroke common in older age than younger because the process of pathology takes longer time to get settled to cause clinical symptoms (Atherosclerosis - stroke).

In our study we found more number of married persons both in amputees and strokes and more number of widow persons in stroke than amputees which is statistically significant ($P < 0.029$). This could be due to majority of sample belongs to marrying age, this finding similar to previous study done by Margoob et al[80].

We also observed that more number of our sample where from rural areas as compare to controls but it was not statistically significant and majority of samples were belonging to low-literacy and lower socio economic state and it was not statistically significant between two groups.

This finding accordance with the previous study done by Shukla et al [9]where he found majority of cases was uneducated and belonging to low socio economic status.

The explanation for this could be most of the population in our state is from rural background and majority of people who visit to government hospital are poor and very difficult for them to offer higher/formal education.

All the samples in our study due to traumatic injury, in that majority are train traffic accidents and road traffic accidents.

This could be due to being a metropolitan city and higher the traffic with increasing vehicle number day by day.

**PREVALENCE OF PSYCHIATRIC MORBIDITY → AMPUTEES**

Many studies have investigated the psychiatric morbidity among the amputees and majority of which mainly focused on depression and anxiety.

In our study common conditions were depression and anxiety.

In our study 73% of amputees on HADS –D and 96% of patients were having abnormal scores on HAM-D and 36.5 were shown abnormal scored and HADS-A (Anxiety).

Our results were in accordance with the study done by Shukla et al (70.2%)[9] and similar findings have also been reported by Rendal et al , and anxiety results were similar to the results shown from previous studies done by Funkunishi et al 33.9%, also supported by other studies done by Kashani et al 1983[27], Atherton et al 2006, Seidel et al 2006[24].

In our study among the depressed individual 53% were falling in the group of moderate to severe depression and 43 were showing mild depression.

Several studies were concentrated on influential factors such as age, sex, social-support, time since amputation and level of amputation.

According to kingdom (1982) and Pearce (1984) and also Cansever et al (2003)[8] reported that age, sex, type and level of amputation influences the psychological reactions.

In our study we could not find any seen findings. It accordance with the other study done by Singh et al (2007)[26], he reports that none of the factor seen as age, gender and other fact to be influential for developing psychological reactions.

Most of the studies found no difference between men and women [Bradway et al 1984[2], Williamson and Walter at al 1996] and in contrary Kashani et al 1983[27] and O Toole et al 1984 reports that women's are more likely to experience depression.

In our study we found younger age group than older age and most of the study says younger age suffers more than older age. (Ward et al and Dunn's et al 1996)[1,20] but we found no scene statistically significant differences. Coming to the etiological factor, many studies reports that traumatic amputees as higher anxiety and depression than amputation due to disease.

In our study all the individuals of traumatic aetiology , so we were not able to find any difference in non traumatic amputees which were not there in our sample . Fisher and Hanspal (1998)[31] suggest that young traumatic Patients may be at higher risk of developing major depression than disease related amputees. Studies says that , Lack of social support also influences in prevalence of depression (Engstorm

et al 2001 and Darnal et al 1996) and increased social isolation associated with higher level of depression (Williamson et al 1984, Thomson et al 1984), supported by another study done by Rybarczyk et al 1992 and 1995[22]. But in our study we could not find such findings this could be due to less sample size. However our results similar to study done by Singh et al (2007)[22].

Several studies established a relationship between time since amputation and depressive symptoms. Depressive symptoms are higher during the initial period of amputation and gradually decline in the latest stages. Singh et al reported rapid decrease in the symptoms of depression and anxiety after a period of inpatient rehabilitation.

In our study we could not establish any relationship between time since amputation and depression symptoms this could be because all are data (samples) are taken within 6 weeks of amputation since patient was interviewed in the treatment setting we not able to establish any relationship. Further follow up is needed after proper social interaction of the individual which is possible after the discharge from the hospital.

Another factor is level of amputation. In our sample out of 30 only 3 (10%) were involving upper limb and 27 (90%) were involving lower limb amputation. In that

90% of lower limb (22) 73.3% were below Knee and 16.7% (5) were above knee amputees

Previous study shows that below knee amputees were more likely to be depressed and anxious than above knee amputees O Toole et al.

In contrary our study did not show any significance difference between above knee and below knee amputees because most of the subject in our study were bed hidden i.e. in treatment setup, and they are not yet exposed to the social interaction to experience difficulty pertaining to the day today activities.

In terms of vocational factor, unemployment and low income influences the anxiety and depressive symptoms , according to Seymous (2002) shows that disabled patients who cannot do their former job, who faces loss of income will be having more adjustment problems and coming to Body Dysmorphic Disorder. We found 6.6% score high on YBOCS – BDD. We found paucity of literature about this.

## Psychiatric Morbidity in stroke Patient

In our study majority of individuals were old age with mean 52.13 with SD 9.61 and there is no significant difference in sex among the stroke patient. This finding is similar to the previous study JO Oladigi et al (2009)[61] and in our study most of the individuals were from poor economic background and lower literacy and majority of people belonging to the Hindu religion.

This could be explained by geographical distribution of the population and economic status among the people in the state. Coming to the proper psychiatric conditions among the stroke majority of the studies concentrated / focused mainly on depression and few studies on anxiety.

We found 63.3% individuals found depressed on HADS and 76.6% found depressed on HAM-D and 7.7 % individuals were suffering from anxiety. [The difference in depression scoring between two scales may due to the HAM-D will pick up the somatic compliance also but it lacks in case of HADS].

This results in approximately similar to the previous studies done by robin son et al 1991. A Schwartz et al 1993[49], they reported that prevalence rages between 20 to 50%. Many studies have studied about the association between age and post stroke

depression. In our study we could not find any association between age and post stroke which is similar to other study done by Robinson et al 1993 and Anderson et al 1994[58]. However reason study shows that risk for depression is stroke patient is being younger than old age Eriksson et al 2004[34], Carota et at 2005[35].

In contrary to general population, higher prevalence of depression among women was not found in our study. Our results are similar with the previous studies Johnson and Anderson et al 1995 and these was supported by other studies done by Haskin et al 2000[62], Ramasubbu and Robinson et al 1998, Berge et al 2003. However these may be real difference in men and women that physical impairment is more influential risk factor in men [Robinson et al 1998] and women previous history psychiatric disorder Berge et al 2003[38].

We observed in our study that most of the individuals were belonging to low socio-economic state and we could not find any association with the symptomatology. It is similar to the previous study done by Anderson et al 1995, reports that socio economic status had no influence on the risk for developing post stroke depression.

We found statistical significance in co-morbid medical illness in post stroke patients when compared with amputees, majority of the individual having Diabetes and Hypertension as a co-morbid condition, this is because these two factors are the major risk for developing stroke I.Alam et al (2004)[59], M.Fayyaz et al 1999[60].

Some study shows that prevalence of depression and anxiety may affect by time from the stroke of onset.

In fact highest rates of incidence of depression and anxiety have been reported during the 1st month of stroke.

In our study also we found higher incidence of depression. Similar to the previous study done by Berger et al (2005), he reported that at least one half of the individuals identified as experiencing depression during the acute post stroke and other studies showed ranges from 40-50% (Dauloci et al 2005, Morison et al 2005).

In contrast post stroke anxiety has recently begins to be investigated with prevalence from 4 to 28% Astrom et al 1996[17].

In our study we found 7.7% prevalence is very much similar to the previous studies. Coming to the laterality, many studies showed various relationships between side of lesion and symptomatology.

In our study 36.7% (11) were having left hemisphere involvement and 63.3% (19) were having lesion on right hemisphere which was confirmed by imaging technique.

Our Study found no significant association between frequency of depression and left hemispheric stroke. This finding contrasts with Robinson et al study which found depression to be significantly associated with left hemispheric stroke, but compares favorably with the study of Ebrahim et al , House et al who found no association between left hemisphere stroke and frequency of depression.

Recent studies shows that psychosocial factors are greater contribution to the development of post stroke depression than lesion location (Singh et al 2000, Berg et al 2003, Carotal et al 2004).

While literature on PSA remains in infancy stage, in our study could not find any significance between prevalence of anxiety and laterality. This finding contrasts with Astorm 1996. Castillo et al 1993, study which found significance association between anxiety and right hemisphere lesion. There is a scarcity of literature in this area.

## Comparison between amputation and post stroke

In this study we used amputation group as a cast and post stroke patient as a control, because there is a equal functional loss of a limb in both groups especially in acute period where clinician also not knowing the actual out come.

There are very less comparative studies available till date. However psychiatric morbidity across the amputees and post stroke patient has been accessed separately. Previous studies report that anxiety and depression is more in post stroke patient Jenkins and Andrews et la. But in our study results are different anxiety and depression appears to be more in amputation patients than post stroke patients.

The explanation for this could be majority of the samples in our case were of younger age group, and they are earning member of the family they have the more responsibility their life pertaining to their family. Majority were consider the amputation as a catastrophic as it occurs all of sudden.

Where as in post stroke patient majority individuals are old age group, were they tend to accept deficits readily than the young people and there will be no anatomical loss hence the patient may having the hope that recovery may be possible.

Coming to body dysmorphic disorder in case of amputee limb will be destroyed, disfigured and finally removed and in case of stroke patient limb will be disabled. So both the group will be more concerned about their body defect.

In this study we tried to find out that at what extent they are concerned about their body defect.

In this study we found 6.6% among the amputees scored high (abnormal) on YBOCS – BDD and non post stroke patients. This is not significant statistical difference.

This could be explained by the factors that, most of the individuals staying in hospital and restricted in their activity and were not completely exposed to the external world after their amputation, further follow up is needed to reveal the real picture in this topic. There is a paucity of literature in this area.

# SUMMARY

The present study has attempted to compare the psychiatric morbidity, mainly concentrating on anxiety and depression, and socio-demographic variables in patients with amputation and post stroke.

The sample in this study consists of 30 amputation patients and 30 post stroke patients from orthopaedic and general medicine inpatient and outpatient department of Stanley Medical College and Hospital chosen after obtaining ethical committee clearance and informed consent.

Used appropriate statistical tests for data analysis like Chi-Square, t- test, multiple regression analysis using SPSS.

Our results showed that psychiatric morbidity is higher in amputation patients than in post stroke patients.

Shows higher level of depression in amputees in comparison to post stroke patients.

Higher rates of anxiety in patients with amputation than in post stroke individuals. But Body Dysmorphic Disorder is not statistically significant between the two groups.

We observed a male predominance in cases than control groups. Our study revealed more number of earning member of the family in case of patients with amputation than post stroke which is statistically significant.

Most of the individuals with post stroke were having DM and HTN as co-morbidity in comparison to amputees.

Looking at the statistics of present study and correlating with present literature, most of the findings in our study correlate with earlier studies. Regarding BDD we are handicapped in comparison due to unavailability of adequate literature on this.

# CONCLUSION

Incidence of depression is higher in amputation patients than patient with post stroke.

Incidence of anxiety is higher in amputation patients than post stroke patients.

Commonly young patients are involved in amputation than elderly.

Males are predominant in amputation.

Majority of them are the earning member of the family.

Post stroke individuals also more prone for depression.

BDD is not statistically significant between the two groups, the real picture will be revealed only after the discharge hence follow up is needed.

Since anxiety and depression is more common in amputees psychiatric intervention is necessary to enhance early recovery and functioning. Hence liaison Psychiatry plays an important role in general hospital setting.

## LIMITATION AND SUGGESTIONS:

Sample size of this study is small hence the findings cannot be generalized.

Larger population and young stroke sample would have strengthened our study.

Patients with aphasia and impaired comprehension (in controls) were not included in this study.

A confounding effect due to medical illness like hypertension and diabetes mellitus could not be avoided.

Follow up study could have given better idea about the development and course of the psychiatric disorder.

In spite of these limitations our study shows similarity with the previous studies. And this is an initial step made to compare both the groups.

Future work is needed in the Indian population as literature in this area is sparse. Large study with control groups might be helpful in providing more details.

## ABBREIVATIONS

| | |
|---|---|
| AK | : Above Knee |
| BK | : Below Knee |
| AE | : Above Elbow |
| BE | : Below Elbow |
| PSD | : Post Stroke Depression |
| PAS | : Post Stroke Anxiety |
| BDD | : Body Dysmorphic Disorder |
| GHQ-28 | : General Health Questionnaire -28 |
| HADS | : Hospital Anxiety and Depression Scale |
| HAM-D | : Hamilton Scale for Depression |
| YBOCS-BDD | : Yale Brown Obsessive Compulsive |

Scale for Body Dysmorphic Disorder.

CES-D : Center for Epidemiologic Studies

Depression Scale

DM : Diabetes Mellitus

HTN : Hypertension

# BIBLIOGRAPHY


1. Wald J, Alvaro R. Psychological factors in work-related amputations: considerations for rehabilitation counselors.*Journal of Rehabilitation* 2004;70(4):6-15.

2. Bradway JK, Malone JM, , Racey J et.al.: Psychological adaptation to amputation: an overview. Orthotics and prosthetics.1984; 38:46-50

3 Kohl SJ. The process of psychological adaptation to traumatic limb loss. In: Krueger DW, ed. Emotional rehabilitation of physical trauma and disability. Spectrum Pub., 1984.

4 Livneh H, Antonak RF, Gerhardt J. 1999. Psychosocial adaptation to amputation: The role of sociodemographic variables, disability-related factors, and coping strategies. Int J Rehabil Res, 22:21-31.

5 Parkes CM. 1976.The psychological reactions to loss of a limb: The first year after amputation. In: Howells JG (ed). Modern Perspectives in the Psychiatric Aspects of Surgery. New York, Brunner-Mazel, pp. 515-32.

6 Block WE, Ventur PA: A study of the psychoanalytic concept of castration anxiety in symbolically castrated amputees. Psychiatr Q 1963; 37: 518-26.

a. 11 . Cansever A, Uzun O, Yildiz C, et al. 2003. Depression in men with traumatic lower part amputation: A comparison to men with surgical lower part amputation. Mil Med, 168:106-9.

7 Frank RG, Kashani JH, Kashani SR, et al. 1984. Psychological response to amputation as a function of age and time since amputation. Br J Psychiatry, 144:493-7.

8 Cansever A, Uzun O, Yildiz C, et al. 2003. Depression in men with traumatic lower part amputation: A comparison to men with surgical lower part amputation. Mil Med, 168:106-9.

9 . Shukla. G.D., Sahu, S.C., Tripathi, R.P. & Gupta, D.K. (1982a) A psychiatric aspects of am- utees. British Journal of Psychiatry, 141, 50-53.

10 Horgan O, MacLachlan M. Psychosocial adjustment to lower-limb amputation: a review. *Disability and Rehabilitation* 2004;26(14/15):837-850

11 Fishman S. Amputee needs, frustrations and behavior. Rehab Lit 1959;20:322-9

12 Robinson RG, Kubos KL, Starr LB, Rao K, Price TR. Mood changes in stroke patients: relationship to lesion location. *Compr Psychiatry.*1983;24:555-566.

13 Newell R. Body-image disturbance: cognitive behavioral formulation and intervention. J of Adv Nurs 1991;16:1400-5.

14 Kolb LC. Disturbances in body image. In: Arieti S, Reiser MF, eds. American Handbook of Psychiatry. New York: Basic Books 1975;4:810-

15 . Randall, G.C., Ewalt, J.R. & Blair, H. (1945) Psychiatric reaction to amputation. Journal of the American Medical Association, 128,645-652.

16. Hackett, M. L., & Anderson, C. S. (2005). Predictors of depression after stroke: A systematic review of observational studies. *Stroke, 36*, 2296-2301.

17.. Astrom, M. (1996). Generalised anxiety disorder in stroke patients: A 3 year longitudinal study. *Stroke, 27*, 270–275

18.. Castillo, C. S., Schultz, S. K., & Robinson, R. (1995). Clinical correlates of early-onset and late-onset poststroke generalised anxiety. *American Journal of Psychiatry, 152*(8), 1174–1181

19.. Schultz, S. K., Castillo, C. S., Kosier, J. T., & Robinson, R. G. (1997). Generalized anxiety and depression: Assessment over 2 years after stroke. *American Journal of Geriatric Psychiatry, 5*(3), 229–237

20. Dunn D. Well-being following amputation: salutary effects of positive meaning, optimism and control.
    a. *Rehabilitation Psychology* 1996;41(4):285-302.

21. Hanley M, Jensen M, Ehde D et al. Psychosocial predictors of long term adjustment to lower limb amputation and phantom limb pain. *Disability and Rehabilitation* 2004;26(14/15):882-893.

22. Rybarczyk, B., Nyenhuis, D. L., Nicholas, J. J., Cash, S. M., & Kaiser, J. (1995). Body image, perceived social stigma, and the prediction of psychosocial adjustment to leg amputation. *Rehabilitation Psychology, 40*(2),95-110.

23. Darnall B, Ephraim P, Wegener S et al. Depressive symptoms and mental health service utilization among personswith limb loss: a national survey. *Archives of Physical Medicine and Rehabilitation* 2005;86(4):650-658.

24. Seidel E, Lange C, Wetz HH, Heuft G. Angst und Depression nach einer Amputation der unteren Extremität. [Anxiety and depression after an amputation of the lower extremity] *Der Orthopäde* 2006;35(11):1152-1158.

25. Desmond DW, Remien RH, Moroney JT, Stern Y, Sano M, Williams JBW. Ischemic stroke and depression. Journal of the International Neuropsychological Society 2003;9:429- 439.

26. Singh R, Hunter J, Philip A. 2007. The rapid resolution of depression and anxiety symptoms after lower limb amputation. Clin Rehabil, 21:754-59.

27. Kashani, Frank R, Kashani S, et al. 1983. Depression among amputees. J Clin Psychiatry, 44:256-8.

28. Schubert DSP, Bums R, Paras W, Sioson E. (1992). decrease of depression during stroke and amputee rehabilitation. *Gn H Psychiatry; 14*:133-141.

29. Schubert, D., Taylor, C., Lee, S., Mentari, A., & Tamaklo, W. (1992). Physical consequences of depression in the stroke patient. General Hospital Psychiatry, 14(1), 69–76.

30. Thompson DM, Haren D. (1983). Living with an amputation: the patient. *Int Rehabil Med.4*:165-169

31. . Fisher K, Hanspal RS. 1998. Phantom pain, anxiety, depression, and their relation in consecutive patients with amputated limbs: Case reports. Br Med J, 316:903-4.

32. Ouimet MA, Primeau F, Cole MG. Psychosocial risk factors in poststroke depression: a systematic review. Can J Psychiatry 2001;46:819-828.

33. Andersen G, Vestergaard K, Ingemann-Neilsen M, Lauritzen L. Risk factors for post-stroke depression. Acta Psychiatr Scan 1995;92:193-198.

34. Eriksson M, Asplund K., Glader EL, et al. Self-reported depression and use of antidepressants after stroke: a national survey. Stroke 2004;35:936-941.

35. Carota A, Berney A, Aybek S, et al. A prospective study of predictors of post-stroke depression. Neurology 2005;64:428-433

36. Paradiso S, Robinson RG. Gender differences in poststroke depression. Journal of Neuropsychiatry 1998;10:41-47.

37. Paolucci S, Gandolfo C, Provinciali L, Torta R, Sommacal S, Toso V. Quantification of the risk of post-stroke depression: the Italian multicenter observational study DESTRO. Acta Psychiatr Scand 2005;112:272-278.

38. Berg A, Palomaki H, Lehtihalmes M, Lonnqvist J, Kaste M. Poststroke Depression: An 18-Month Follow-Up. Stroke 2003;34:138-143.

39. Spalletta G, Ripa A, Caltagirone C. Symptom profile of DSM-IV major and minor depressive disorders in first-ever stroke patients. Am J Geriatr Psychiatry 2005;13:108-115.

40. Jorge RE, Robinson RG, Arndt S, Starkstein S. Mortality and poststroke depression. A placebo-controlled trial of antidepressants. Am J Psychiatry 2003; 160: 1823-1829.

41. Andersen G, Vestergaard K, Ingemann-Neilsen M, Lauritzen L. Risk factors for post-stroke depression. Acta Psychiatr Scan 1995;92:193-198.

42. Aben I, Verhey F, Strik J, Lousberg R, Lodder J, Honig A. A
    a. comparative study into the one year cumulative incidence of depression after stroke and myocardial infarction. J Neurol Neurosurg Psychiatry 2003;74:581-585
    b. Aben I, Lodder J, Honig A, Lousberg R, Boreas A, Verhey F. Focal or generalized vascular brain damage and vulnerability to depression after stroke: a 1-year prospective follow-up study. Int Psychogeriatr 2006;18:19-35

43. Bhogal SK, Teasell R, Foley N, Speechley M. Lesion Location and Poststroke Depression: Systematic Review of the Methodological Limitations in the Literature. Stroke 2004;35:794-802.

44. Morrison V, Pollard B, Johnston M, Macwalter R. Anxiety and depression 3 years following stroke: Demographic, clinical, and psychological predictors. J Psychosom Res 2005;59:209-213.

45. Burvill, P. W., Johnson, G. A., Jamrozik, K. D., & Anderson, C. S. (1995). Prevalence of depression after stroke: The Perth Community Stroke Study. *British Journal of Psychiatry*, *166*(3), 320–327.

46. Parikh, R., Lipsey, J., Robinson, R., & Price, T. (1988). A two year longitudinal study of post stroke mood disorders: Prognostic factors related to one and two year outcome. International Journal of Psychiatry in Medicine, 18(1), 45–56.

47. Fedoroff, J., Starkstein, S., Parikh, R., Price, T., &Robinson, R. (1991). Are depressive symptoms nonspecific in patients with acute stroke? *American Journal of Psychiatry, 148*(9), 1172–1176.

48. Morris, P., & Robinson, R. (1998). Does stroke cause depression? *Journal of Neuropsychiatry & Clinical Neurosciences*, *10*(1), 103–107

49. Schwartz, J. A., Speed, N. M., Brunberg, J. A., Brewer, T. L., Brown, M., & Greden, J. F. (1993). Depression in stroke rehabilitation. Biological Psychiatry, 33(10), 694–699..

50. Whyte, E. M., & Mulsant, B. H. (2002). Post stroke depression: Epidemiology, pathophysiology, and biological treatment. *Biological Psychiatry*, *52*, 253–264.

51. Hermann M, Bartels C, Schumacher M, Wallesch C-W. Poststroke Depression. Is there a pathoanatomic correlate for depression in the postacute stage of stroke? Stroke 1995;26: 850-856.

52. Robinson, R. G., & Price, T. R. (1982). Post-stroke depressive disorders: A follow-up study of 103 patients. *Stroke*, *13*(5), 635-641.

.

53. Chemerinski, E., & Robinson, R. G. (2000). The neuropsychiatry of stroke. Psychosomatics, 41(1), 5–14.

54.. Dennis, M., O'Rourke, S., Lewis, S., Sharpe, M., & Warlow, C.

i. (2000). Emotional outcomes after stroke: Factors associated with

ii. poor outcome. Journal of Neurology, Neurosurgery, & Psychiatry,

iii. 68, 47–52

55.. Shimoda, K., & Robinson, R. G. (1998). The relationship between social impairment and recovery from stroke. *Psychiatry*, *61*, 101–110.

56. Robinson RG, Szetela B. Mood change following left hemispheric brain injury. Ann Neurol 1981;9:447-453.

57. Herrmann, N., Black, S., Lawrence, J., Szekely, C., & Szalai, J. (1998). The Sunnybrook Stroke Study: A prospective study of depressive symptoms and functional outcome. Stroke, 29(3), 618–624.

58.. Anderson, G., Vestergaard, K., Riis, J., & Lauritzen, L. (1994).

a. Incidence of post-stroke depression during the first year in a large
b. unselected stroke population determined using a valid standardized
c. rating scale. *Acta Psychiatrica Scandinavica*, *90*, 190–195.

59.I. Alam, I. Haider, F. Wahab, W. Khan. Risk factors stratification in 100 patients of acute stroke; 2004; Journal of Postgrad Med Inst; 18:583–91.

60.M. Fayyaz, M.A. Hassan and M. Atique. Risk Factors and Early Prognosis in Stroke.1999; Ann King Edward Med Coll;5:12-5.

61.JO Oladiji1, SRA Akinbo1, OF Aina2, CB Aiyejusunle1; Afr.J Psychiatry, 2009.

*62.* Hosking, S., Marsh, N., & Friedman, P. (2000). Depression at 3-months poststroke in the elderly: Predictors and indicators of prevalence. *Aging Neuropsychology & Cognition*, *7*(4), 205–216.

63. Morris, P., Robinson, R., & Raphael, B. (1990). Prevalence and course of depressive disorders in hospitalised stroke patients. *International Journal of Psychiatry in Medicine*, *20*(4), 349–364.

64. Calvert T, Knapp P, House A. Psychological associations with emotionalism after stroke. J Neurol Neurosurg Psychiatry 1998;65:928-929.

65. Jenkins, Andrewes, Hale, Coetzee & Khan: Contribution of perceived disability to depression.

66. Ehde D, Williams R, Hoffman A. A 2-year longitudinal study of depression following amputation. [Abstract]*Rehabilitation Psychology* 2002;47(3):358.

67. Verdelho A, Henon H, Lebert F, Pasquier F, Leys D. Depressive symptoms after stroke and relationship with dementia. A three-year follow-up study. Neurology 2004;62:905-911.

68. Starkstein, S., Bryer, J., Berthier, M., & Cohen, B. (1991). Depression after stroke: The importance of cerebral hemisphere

asymmetries. Journal of Neuropsychiatry & Clinical Neurosciences, 3(3), 276–285

69. Morrison, V., Johnston, M., & Walter, R. M. (2000). Predictors of distress following an acute stroke: Disability, control cognitions, and satisfaction with care. *Psychology and Health, 15,* 395–407

70. Robinson, R. G., & Price, T. R. (1982). Post-stroke depressive disorders: A follow-up study of 103 patients. *Stroke, 13*(5), 635-641.

71. Robinson RG, Kubos KL, Starr LB, Rao K, Price TR. Mood changes in stroke patients: relationship to lesion location. *Compr Psychiatry.*1983;24:555-566.

72. Robinson RG, Kubos KL, Starr LB, Rao K, Price TR. Mood disorders in stroke patients: importance of location of lesion. *Brain.* 1984;107:81-93

.

73. Eastwood MR, Rifat SL, Nobbs H, Ruderman J. Mood disorder following cerebrovascular accident. Br J Psychiatry 1989;154:195-200.

74. Parikh, R., Lipsey, J., Robinson, R., & Price, T. (1988). A two year longitudinal study of post stroke mood disorders: Prognostic factors related to one and two year outcome. International Journal of Psychiatry in Medicine, 18(1), 45–56.

75. Schwartz, J. A., Speed, N. M., Brunberg, J. A., Brewer, T. L., Brown, M., & Greden, J. F. (1993). Depression in stroke rehabilitation. Biological Psychiatry, 33(10), 694–699

76. Starkstein, S., Bryer, J., Berthier, M., & Cohen, B. (1991). Depression after stroke: The importance of cerebral hemisphere asymmetries. Journal of Neuropsychiatry & Clinical Neurosciences, 3(3), 276–285

77. Christensen MC, Mayer SA, Ferran JM, Kissela B. Depressed mood after intracerebral hemorrhage: the FAST trial. Cerebrovasc Dis 2009;27(4):353-60

78. Sinyor O, Jacques P, Kaloupek D, Becker R, Goldenberg M, Coopersmith H. Post-stroke depression and lesion location. Brain 1986;105:537-546.

79. Cavanagh SR, Shin LM, Karamouz N, Rauch SL: Psychiatric and emotional sequelae of surgical amputation. Psychosomatics 2006, 47:459–464

80. Imtiyaz mansoor, musthaq A Margoob et all : prevalence of psychiatric co-morbidities in traumatic amputees- Across sectional study from Kashmir.

PROFORMA

1. NAME:
2. SAMPLE: :1. Case 2. Control
3. AGE:
4. SEX: :1. Male 2.female
5. RELIGION: : 1.Hindu 2. Christian 3. Muslim 4. Jain
6. OCCUPATION: **:**1)semi skilled 2) skilled 3) dependent
   4) professional
   5)unemployed 6) Retired
7. Locality: :1.Rural/2.semi urban/3.Urban

Contact number:

8.EDUCATION:

1. Illiterate
2. Primary
3. $10^{th}$ std
4. Secondary
5. Graduation
6. Post graduation

9.SOCIO ECONOMIC STATUS

1. <1000
2. 1000-5000
3. 5000-10000
4. >10000

10. FAMILY
    1. Nuclear
    2. Joint
11. MARITAL STATUS
    1. Married
    2. Unmarried
    3. Divorced
    4. Separated
    5. Widowed

12. CARE GIVER
    1. Self
    2. Spouse
    3. Relative
    4. Friend
13. INFORMATION GIVEN BY:
    1. Self
    2. Family/ care givers relationship
    3. Friends
14. RANK IN THE FAMILY -
    1. Earning member
    2. Non earning member
15. REFERRAL FROM

1. OPD 2. WARD

16. LEVEL OF AMPUTATION (LOA)

1) Rt.AE 2) Rt.BE 3) Rt.AK 4)Rt.BK 5) Lt.AE 6) Lt.BE 7) Lt.AK 8) Lt.BK

17. TYPE OF AMPUTATION

1)TRAUMATIC (mention the cause)- 1. Train accident 2. Road traffic 3. Fall injury

2)ELECTIVE: 1. Diabetic Foot 2. Tumour 3. Infection

18. CLINICAL DIAGNOSIS OF STROKE

1. Rt. Hemiparesis 2.Rt. hemiplegia 3. Lt. Hemiparesis 4. Lt. Hemiplegia 5. Rt. Facio-brachial monoparesis 6. Lt. facio-brachial monoparesis 7) Others

19. ETIOLOGY – 1.Infarct,

2.Hemorrhage

20. SITE OF PATHOLOGY (imaging findings)

1. Rt Internal Capsule 2. Rt Frontal 3. Rt Thalamic

4. Lt Internal Capsule 5. Lt Frontal 6. Lt Thalamic

21. SOCIAL SUPPORT:

1) Negative (0-1)

2) Positive (>2 )

22. PREVIOUS PHYSICAL ILLNESS.

1. DM 2. HTN 3. DM+HTN 4.Asthma 5. CHD 6. ARF 7. CRF
8. Cancer 9. Seizure disorder 10. Head injury 11. Others

23. PREVIOUS PSYCHIATRIC ILLNESS.

1.Yes 2.No

24. PREVIOUS TREATMENT HISTORY

1.Yes 2 No

26. SUBSTANCE USE

1. LSD
2. Cocaine
3. Amphetamines
4. Phencyclidine
5. Marijuana
6. Alcohol
7. Nil

27.ACCIDENT REGISTRY DONE

1.YES 2.NO

28 . SUICIDE ATTEMPTED

1.YES 2.NO

29. FAMILY HISTORY

1) Suicide
2) Mental Illness
3) DM
4) HTN
5) DM +HTN
6) Stroke
7) CHD
8) Cancer

| Name of the patient | Sample | Age | Sex | Occupation | Religion | Locality | Education | Socio-economic status | Fmaily | Marital status | Care giver | Information by | Rank in family | Referal | Level of Amputation | Type of Amputation- traumatic | Stroke Diagnosis | Etiology | Site of Pathology | Social Support | Past Physical illness | Previous treatment | Past Psychiatric illness | Substance use | AR Entry | Suicide Past | Family history | GHQA | GHQB | GHQC | GHQD | HADS -A | HADS-D | HADS-TOTAL | HAM-D | mY-BOCS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annappan | 1 | 28 | 1 | 1 | 1 | 3 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 16 | 17 | 16 | 17 | 11 | 9 | 20 | 13 | 1 |
| Sugreevan | 1 | 43 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 4 | 2 | 2 | 7 | 1 | 2 | 9 | 17 | 17 | 18 | 17 | 10 | 12 | 22 | 14 | 6 |
| Balavan | 1 | 26 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 18 | 17 | 16 | 20 | 9 | 12 | 21 | 15 | 3 |
| Meera | 1 | 49 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 1 | | | | 1 | 4 | 2 | 2 | 7 | 2 | 2 | 9 | 17 | 16 | 16 | 19 | 11 | 12 | 23 | 10 | 3 |
| Johnson | 1 | 19 | 1 | 4 | 2 | 2 | 4 | 2 | 1 | 2 | 3 | 1 | 2 | 2 | 7 | 1 | | | | 2 | 14 | 1 | 2 | 7 | 2 | 2 | 9 | 16 | 17 | 15 | 17 | 4 | 6 | 10 | 10 | 1 |
| Pushpammal | 1 | 60 | 2 | 1 | 1 | 3 | 1 | 2 | 1 | 5 | 3 | 1 | 1 | 2 | 4 | 1 | | | | 1 | 14 | 2 | 2 | 7 | 1 | 2 | 9 | 16 | 18 | 15 | 18 | 5 | 11 | 16 | 20 | 4 |
| Ganesan | 1 | 30 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 16 | 16 | 17 | 9 | 13 | 22 | 16 | 3 |
| Premalatha | 1 | 37 | 2 | 4 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 7 | 1 | 2 | 9 | 18 | 20 | 16 | 20 | 18 | 21 | 39 | 32 | 20 |
| suresh | 1 | 27 | 1 | 2 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 14 | 16 | 15 | 15 | 1 | 8 | 9 | 17 | 2 |
| Jagan | 1 | 31 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 8 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 1 | 1 | 17 | 19 | 15 | 16 | 10 | 10 | 20 | 12 | 1 |
| Kumaresan | 1 | 18 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | | | | 2 | 14 | 2 | 2 | 7 | 1 | 2 | 9 | 16 | 18 | 16 | 20 | 7 | 11 | 18 | 9 | 3 |
| Saroja | 1 | 60 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 8 | 2 | 2 | 7 | 1 | 2 | 9 | 15 | 16 | 15 | 15 | 0 | 6 | 6 | 8 | 1 |
| Saranga pani | 1 | 60 | 1 | 1 | 1 | 1 | 4 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 8 | 1 | | | | 2 | 4 | 2 | 2 | 6 | 1 | 2 | 9 | 14 | 15 | 14 | 19 | 6 | 16 | 22 | 21 | 4 |
| Kannan | 1 | 28 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 8 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 16 | 14 | 15 | 2 | 8 | 10 | 10 | 2 |
| Gopal | 1 | 48 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 4 | 3 | 1 | 1 | 2 | 3 | 1 | | | | 1 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 15 | 14 | 15 | 2 | 6 | 8 | 9 | 1 |
| Tamil selvam | 1 | 21 | 1 | 2 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 16 | 20 | 15 | 15 | 8 | 7 | 15 | 14 | 3 |
| Raja | 1 | 36 | 1 | 2 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 14 | 15 | 14 | 16 | 5 | 5 | 10 | 12 | 1 |
| Sampat kumar | 1 | 29 | 1 | 4 | 1 | 1 | 4 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 8 | 1 | | | | 2 | 13 | 2 | 2 | 7 | 1 | 2 | 9 | 15 | 16 | 15 | 17 | 11 | 8 | 19 | 17 | 2 |
| Murugan | 1 | 58 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 7 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 17 | 16 | 24 | 18 | 3 | 11 | 14 | 14 | 5 |
| Rabeen kumar | 1 | 26 | 1 | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 1 | | | | 2 | 14 | 2 | 2 | 7 | 1 | 2 | 9 | 20 | 24 | 22 | 24 | 13 | 21 | 24 | 25 | 18 |
| Bhaskaran | 1 | 32 | 1 | 2 | 1 | 1 | 5 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 8 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 16 | 15 | 18 | 3 | 5 | 8 | 9 | 3 |
| Arokya samy | 1 | 45 | 1 | 1 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 17 | 16 | 14 | 15 | 4 | 6 | 10 | 6 | 1 |
| shanmugan | 1 | 60 | 1 | 1 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 8 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 19 | 20 | 19 | 20 | 8 | 11 | 19 | 16 | 3 |
| Balamurugan | 1 | 35 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 1 | 14 | 16 | 15 | 14 | 3 | 9 | 12 | 14 | 2 |
| Immanvel | 1 | 57 | 1 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 1 | 2 | 2 | 4 | 1 | | | | 2 | 2 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 15 | 14 | 15 | 4 | 11 | 15 | 10 | 3 |
| Gopal | 1 | 45 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 17 | 15 | 16 | 3 | 9 | 12 | 13 | 2 |
| Rajesh | 1 | 34 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 6 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 16 | 16 | 16 | 2 | 10 | 12 | 14 | 4 |
| kandasamy | 1 | 36 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 8 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 15 | 16 | 14 | 16 | 4 | 7 | 11 | 10 | 2 |
| yellamma | 1 | 55 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 7 | 1 | 2 | 9 | 15 | 15 | 15 | 20 | 6 | 14 | 20 | 18 | 7 |
| Muniam | 1 | 42 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 4 | 1 | | | | 2 | 14 | 2 | 2 | 6 | 1 | 2 | 9 | 16 | 16 | 15 | 17 | 4 | 11 | 15 | 14 | 3 |

# controls

| Name of the patient | Samp | Age | Sex | Occup | Religi | Local | Educa | Socio | Fma | Marit | Care | Info | Rank | Refe | Level | Type | Strok | Etiolo | Site o | Socia | Past F | Previo | Past P | Sub | AR | Suici | Fam | A | B | C | D | HADS | HADS | HADS- | HAM-D | mY-BOCS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jayapal | 2 | 60 | 1 | 1 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 6 | 0 | 2 | 9 | 19 | 18 | 14 | 15 | 4 | 6 | 10 | 10 | 2 |
| kamarunisha | 2 | 41 | 2 | 4 | 3 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 2 | 2 | | | 3 | 1 | 2 | 1 | 13 | 1 | 2 | 7 | 0 | 2 | 9 | 16 | 17 | 15 | 17 | 6 | 10 | 16 | 11 | 3 |
| Stalin | 2 | 45 | 1 | 1 | 1 | 3 | 4 | 2 | 1 | 5 | 3 | 1 | 1 | 2 | | | 3 | 1 | 2 | 2 | 1 | 1 | 2 | 7 | 0 | 2 | 9 | 17 | 16 | 17 | 15 | 3 | 7 | 10 | 8 | 1 |
| Shankar | 2 | 36 | 1 | 2 | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | | | 3 | 1 | 7 | 2 | 1 | 1 | 2 | 6 | 0 | 2 | 9 | 15 | 17 | 15 | 15 | 7 | 7 | 14 | 9 | 1 |
| Saraswathi | 2 | 60 | 2 | 4 | 1 | 3 | 1 | 1 | 1 | 5 | 3 | 2 | 2 | 2 | | | 4 | 1 | 7 | 2 | 2 | 1 | 2 | 7 | 0 | 2 | 9 | 15 | 15 | 15 | 18 | 6 | 13 | 19 | 18 | 3 |
| Sreenivasan | 2 | 50 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 6 | 1 | 12 | 2 | 14 | 1 | 2 | 6 | 0 | 2 | 9 | 15 | 15 | 14 | 14 | 0 | 1 | 1 | 4 | 1 |
| Sathyamoorthy | 2 | 59 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 5 | 3 | 1 | 1 | 2 | | | 2 | 1 | 7 | 1 | 13 | 1 | 2 | 7 | 0 | 1 | 9 | 15 | 16 | 14 | 19 | 8 | 14 | 22 | 24 | 4 |
| Chinnammal | 2 | 60 | 2 | 4 | 1 | 3 | 1 | 1 | 1 | 5 | 3 | 1 | 2 | 2 | | | 4 | 1 | 7 | 2 | 3 | 2 | 2 | 7 | 0 | 2 | 2 | 15 | 16 | 15 | 15 | 6 | 12 | 18 | 15 | 3 |
| kuppammal | 2 | 58 | 2 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | | | 3 | 1 | 11 | 2 | 4 | 1 | 2 | 7 | 0 | 2 | 9 | 15 | 16 | 14 | 16 | 5 | 12 | 17 | 14 | 3 |
| Ganesan | 2 | 60 | 1 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | | | 4 | 1 | 12 | 1 | 13 | 2 | 2 | 7 | 0 | 2 | 2 | 18 | 15 | 17 | 18 | 3 | 13 | 16 | 11 | 3 |
| Jayameri | 2 | 55 | 2 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | | | 2 | 1 | 2 | 2 | 14 | 2 | 2 | 7 | 0 | 2 | 9 | 15 | 15 | 14 | 15 | 2 | 9 | 11 | 7 | 2 |
| Laksmi | 2 | 57 | 2 | 4 | 1 | 3 | 2 | 2 | 1 | 5 | 3 | 1 | 2 | 2 | | | 2 | 1 | 7 | 1 | 2 | 1 | 2 | 7 | 0 | 2 | 9 | 15 | 15 | 14 | 16 | 1 | 8 | 9 | 10 | 2 |
| Ekambaram | 2 | 60 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 5 | 1 | 1 | 1 | 2 | | | 6 | 1 | 13 | 1 | 14 | 2 | 2 | 6 | 0 | 2 | 9 | 15 | 17 | 14 | 18 | 3 | 9 | 12 | 12 | 2 |
| Murugan | 2 | 37 | 1 | 2 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | | | 1 | 1 | 12 | 2 | 14 | 2 | 2 | 6 | 0 | 2 | 5 | 15 | 15 | 15 | 14 | 3 | 8 | 11 | 9 | 2 |
| Subadra | 2 | 57 | 2 | 4 | 1 | 2 | 3 | 2 | 1 | 3 | 3 | 1 | 2 | 2 | | | 1 | 1 | 2 | 2 | 3 | 1 | 2 | 7 | 0 | 2 | 8 | 15 | 15 | 14 | 14 | 1 | 4 | 5 | 7 | 1 |
| Meri | 2 | 56 | 2 | 5 | 3 | 3 | 5 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | | | 1 | 1 | 2 | 2 | 14 | 2 | 2 | 7 | 0 | 2 | 6 | 14 | 16 | 14 | 14 | 1 | 3 | 4 | 8 | 1 |
| Vasantha | 2 | 58 | 2 | 4 | 1 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 2 | 2 | | | 3 | 1 | 7 | 2 | 1 | 1 | 2 | 7 | 0 | 2 | 9 | 16 | 14 | 17 | 16 | 2 | 8 | 10 | 11 | 3 |
| Krishnan | 2 | 29 | 1 | 2 | 1 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | | | 2 | 1 | 2 | 2 | 14 | 2 | 2 | 6 | 0 | 2 | 9 | 16 | 16 | 16 | 15 | 4 | 9 | 13 | 11 | 3 |
| Ajjayya | 2 | 60 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 4 | 1 | 12 | 2 | 3 | 1 | 2 | 6 | 0 | 2 | 9 | 16 | 15 | 15 | 15 | 2 | 8 | 10 | 9 | 2 |
| Chandrashekar | 2 | 27 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 2 | 3 | 1 | 1 | 2 | | | 4 | 1 | 2 | 2 | 6 | 1 | 2 | 6 | 0 | 2 | 9 | 16 | 16 | 14 | 14 | 2 | 3 | 5 | 9 | 3 |
| kuppusamy | 2 | 57 | 2 | 1 | 1 | 3 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 3 | 1 | 3 | 2 | 14 | 2 | 2 | 6 | 0 | 2 | 9 | 18 | 15 | 14 | 14 | 2 | 4 | 6 | 4 | 2 |
| Elumalai | 2 | 55 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | | | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 6 | 0 | 2 | 9 | 17 | 18 | 18 | 16 | 8 | 11 | 19 | 13 | 3 |
| Arumugan | 2 | 60 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 5 | 3 | 1 | 1 | 2 | | | 1 | 1 | 11 | 1 | 2 | 1 | 2 | 6 | 0 | 2 | 9 | 15 | 15 | 15 | 15 | 6 | 5 | 11 | 4 | 1 |
| Radha | 2 | 45 | 2 | 4 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | | | 5 | 1 | 12 | 2 | 3 | 2 | 2 | 7 | 0 | 2 | 9 | 16 | 15 | 15 | 18 | 4 | 9 | 13 | 16 | 4 |
| Marimuthu | 2 | 50 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 3 | 1 | 12 | 2 | 2 | 1 | 2 | 6 | 0 | 2 | 9 | 16 | 15 | 14 | 15 | 3 | 4 | 7 | 6 | 1 |
| meenachi | 2 | 56 | 2 | 1 | 1 | 2 | 2 | 3 | 1 | 5 | 3 | 1 | 2 | 2 | | | 4 | 1 | 7 | 2 | 3 | 1 | 2 | 7 | 0 | 2 | 9 | 15 | 15 | 15 | 15 | 3 | 9 | 12 | 11 | 3 |
| kuppammal | 2 | 58 | 2 | 4 | 1 | 1 | 1 | 3 | 1 | 5 | 3 | 1 | 2 | 2 | | | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 7 | 0 | 2 | 4 | 15 | 16 | 15 | 16 | 3 | 9 | 12 | 9 | 3 |
| Purusotham | 2 | 50 | 1 | 1 | 1 | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | | | 6 | 1 | 13 | 2 | 2 | 1 | 2 | 6 | 0 | 2 | 9 | 15 | 15 | 14 | 14 | 2 | 4 | 6 | 5 | 1 |
| kannan | 2 | 60 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | | | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 6 | 0 | 2 | 9 | 15 | 17 | 15 | 17 | 4 | 10 | 14 | 12 | 3 |
| murugesan | 2 | 48 | 1 | 2 | 1 | 2 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | | | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 6 | 0 | 2 | 9 | 16 | 17 | 15 | 17 | 7 | 13 | 20 | 14 | 4 |